Smithsonian

June 1986

Young connoisseur contemplates
a La Tour in Los Angeles,
where art is in full flower (p. 88)

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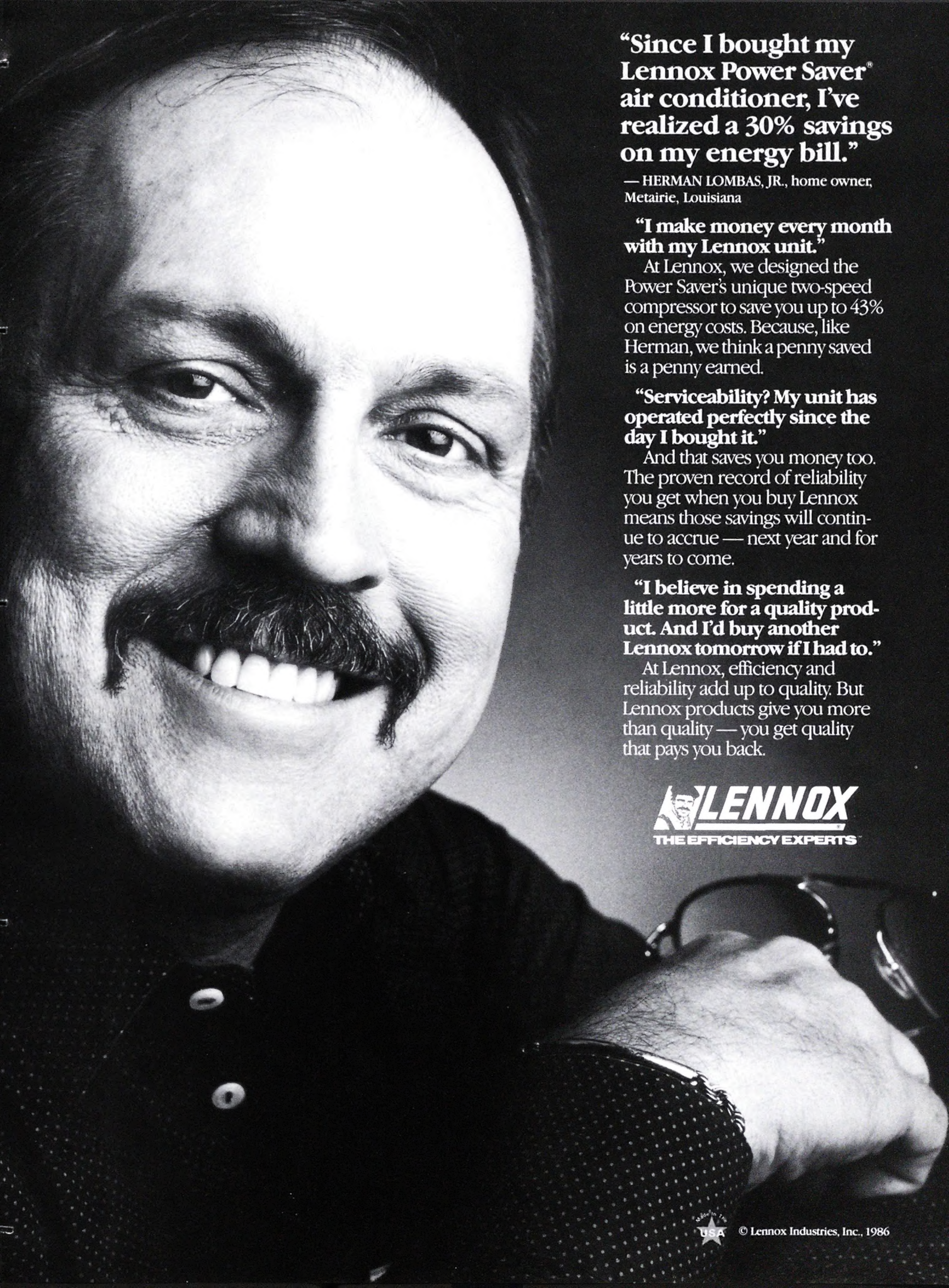

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June 1986

Smithsonian

Volume 17, Number 3

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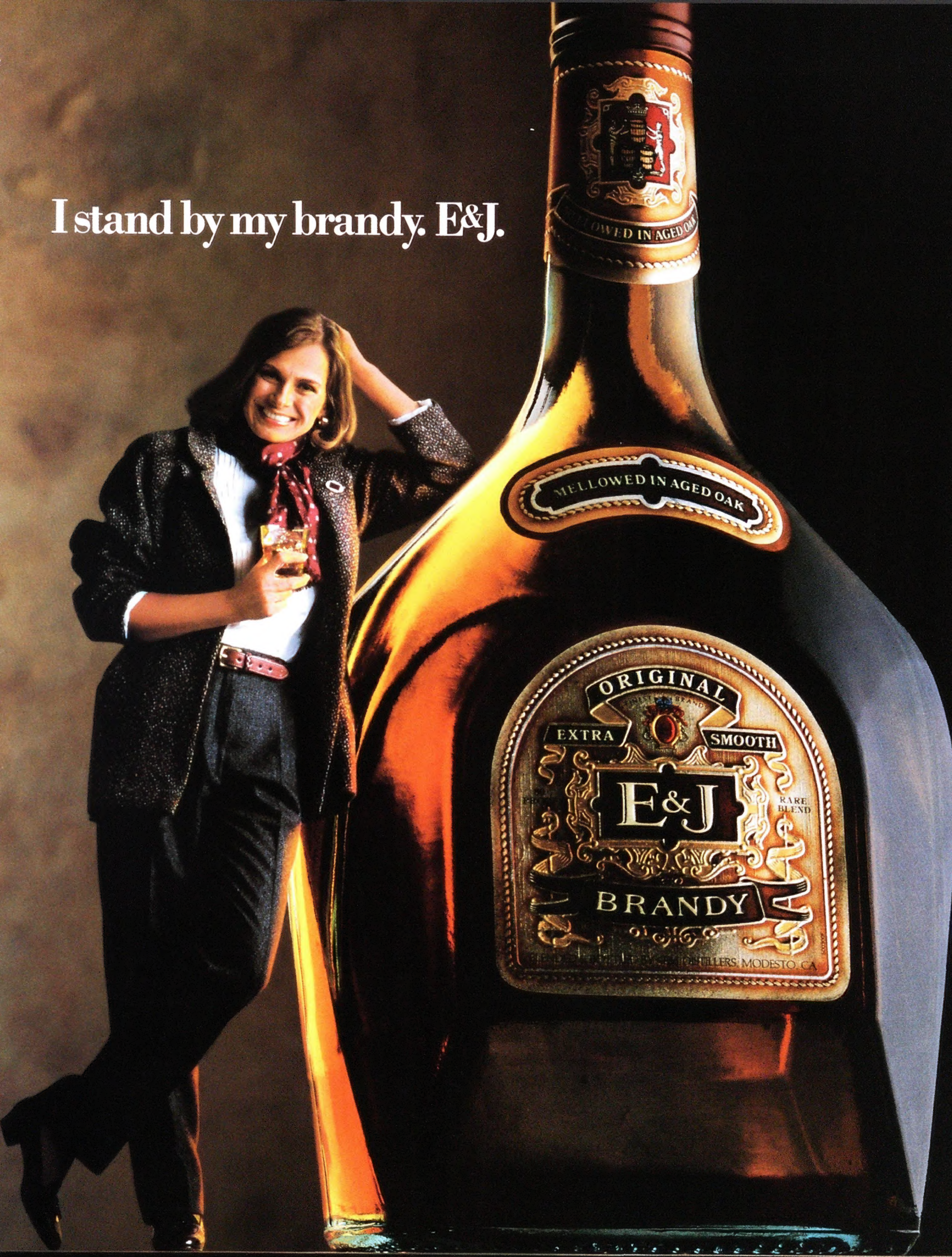

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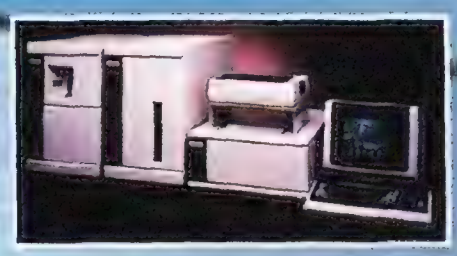

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Secretary Adams' comments

Smithsonian horizons

Art thrives more vigorously on controversy than on consensus, which usually opts for the safety and blandness of the mainstream

Two recent, very different encounters illuminate a challenge confronting any Smithsonian spokesperson. Begin with the professed reaction of a visiting friend and colleague from the Middle East to the collection of our Hirshhorn Museum and Sculpture Garden: "Do you like it because it is there? Do you want to convince me that it is philosophy?" How determinedly should a nonspecialist like myself spring to the defense of modern art?

Perhaps not even an expert could be genuinely persuasive under these circumstances. Esthetic sensitivities are less a set of reasoned arguments than a flag nailed to a mast. Think of Smithsonian benefactor Joseph H. Hirshhorn himself: "I've made a few mistakes along the way," he once told an interviewer. "I've bought things—especially in the beginning—that not many people liked, but *I* liked them, so how can you call them mistakes?" And "I don't care if [something] *belongs* in the collection or not, I just want it where I can live with it."

Alongside this let me recount the stirring experience of a visit to "The New Painting: Impressionism 1874-1886," then at the National Gallery of Art. This show was organized by Charles S. Moffett of the Fine Arts Museums of San Francisco, where it is currently on view. It brings together more than 150 works that were created outside the canons of accepted taste, as formalized by the officially sponsored Salons. Re-created in this way is the spirit, and to an admirable extent even the substance, of the eight exhibitions that the independent artists organized in Paris. The format lays bare the rapidly evolving diversity in what was offered, and for the most part was instantly recognizable, as explosively new.

Equally revealing are the reported divergences of the critics—not to speak of deep schisms among the artists themselves. Much opinion, then thought weighty, was merely dismissive or even indignant about individual works. There were outspokenly sympathetic critics, too, and still others caught between new and traditional modes of perception and expression: "Obviously, this is not the last word in art, nor even of this art. . . . But what a bugle call for those who would listen carefully, how it resounds far into the future!" The dominant impression is thus of a gauntlet thrown down, and of an electric air of controversy.

I cite these vigorously independent, and historically consequential, reactions out of no faith whatever in the attainment of a single "truth" or certainty about art. But they engender doubt about our present course. The *New York Times*, for instance, reported a year ago that there is a "spreading conviction art is good for big business—and vice versa." The first part is clear enough. The fine arts have contributed to corporate objectives at least since the time of the Medici. If a "broad segment of the public today no longer views contemporary art as elitist and reclusive, but as entertaining, with-it, and environmentally uplifting," then even "tough bottom-liners" may invest in art-acquisition programs.

The trouble comes with the vice-versa part. Any widening of the market is surely good for artists' incomes, and prolonged exposure, even in executive offices, must offer at least a modest stimulus to awaken public tastes. But acquisition committees, even under the guidance of expert consultants, can be expected to gravitate toward the safe and unadventurous mainstream.

"Usually taboo," according to *Newsweek* last fall, is "anything that smacks of sex, violence, religion or politics." With acceptable art having to pass through this kind of blander, what place is there for the truly innovative or controversial? Hirshhorn, I take for granted, would have been a fish out of water on any art acquisition committee. On the other hand, he would have been in the thick of the crowds at those openings of the Impressionists.

We are lucky to have an exciting collection like his where we, too, can live with it. Is that in spite of, or more likely because of, the controversy it excites? We may create the conditions for progress less often by insisting on consensus than by welcoming controversy.

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AT&T has shattered the information barrier—with a beam of light.

Recently, AT&T Bell Laboratories set the world record for transmission capacity of a lightwave communications system—20 billion pulses of light per second. The equivalent of 300,000 conversations, sent 42 miles, on a hair-thin fiber of super-transparent glass. But that's really getting ahead of the story.

Actually, the 20-gigabit record is only one of a series of AT&T achievements in the technology of lightwave communications.

But what does that record mean?

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All of us face a major problem in this Information Age: too much data and too little information. The 20-gigabit lightwave record means AT&T is helping to solve the problem.

For data to become useful information, it must first be quickly, accurately and securely moved to a data transformer—a computer, for instance. Getting there, however, hasn't always been half the fun.

Metallic pathways have a limited transmission speed, sensitivity to electrical interference and potential for interception—factors that reduce the effectiveness of today's powerful computers. Factors that are eliminated by lightwave communications technology.

Ten Goes Into One 20 Billion Times

Three primary components make up any lightwave communications system. On the transmitting end, a laser or light-emitting diode; on the receiving end, a highly sensitive photodetector; and in the middle, super-transparent glass fibers we call lightguides.

Installing these fibers is a major cost of a lightwave communications system. So, once installed they should stay put—increased capacity should come from fibers carrying more, rather than from more fibers.

Which brings us to the 20-billion bit-per-second story—about experimental technology that has the potential to upgrade installed fiber to meet any foreseeable capacity needs.

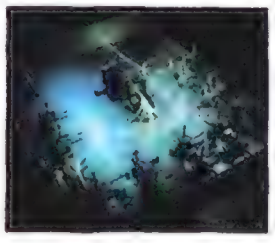
Using new, sophisticated lightwave system components, we multiplexed (combined) the outputs from 10 slightly different colored 2-billion bit-per-second laser beams into a single 20-billion bit-per-second data stream.

Playing Both Ends Against The Middle

But, let's start at the beginning—the 10 distributed feedback laser transmitters.

These powerful semiconductor lasers can be grown to produce light of different, but very precise, wavelengths. The lasers we used transmitted in the 1.55 micron (infrared) range, with only minuscule fractions of a micron between their wavelengths. The purity and stability of the beams let us pack their ten colors into the most efficient transmitting region of our single-mode, silica-core fiber.

To make the original 10 beams into one, a fiber from each laser was fed into a new lightwave multiplexer—a prism-like grating that exactly aimed each beam into the single transmission fiber. Over 42 miles later, a second grating fanned the beam back into its original 10 colors for delivery to 10 exceptionally sensitive avalanche photodetectors—receivers that convert the light pulses back into electrical signals and amplify them many times.



20-gigabit multiplexer

A similar avalanche photodetector was the receiver when AT&T Bell Laboratories set the world record for unboosted lightwave transmission—125 miles at 420 million bits per second.

From Sea To Shining Sea

System capacity is important. But system reliability is vital. Especially when the system is going under 10 thousand miles of water—and is expected to last for 25 years.

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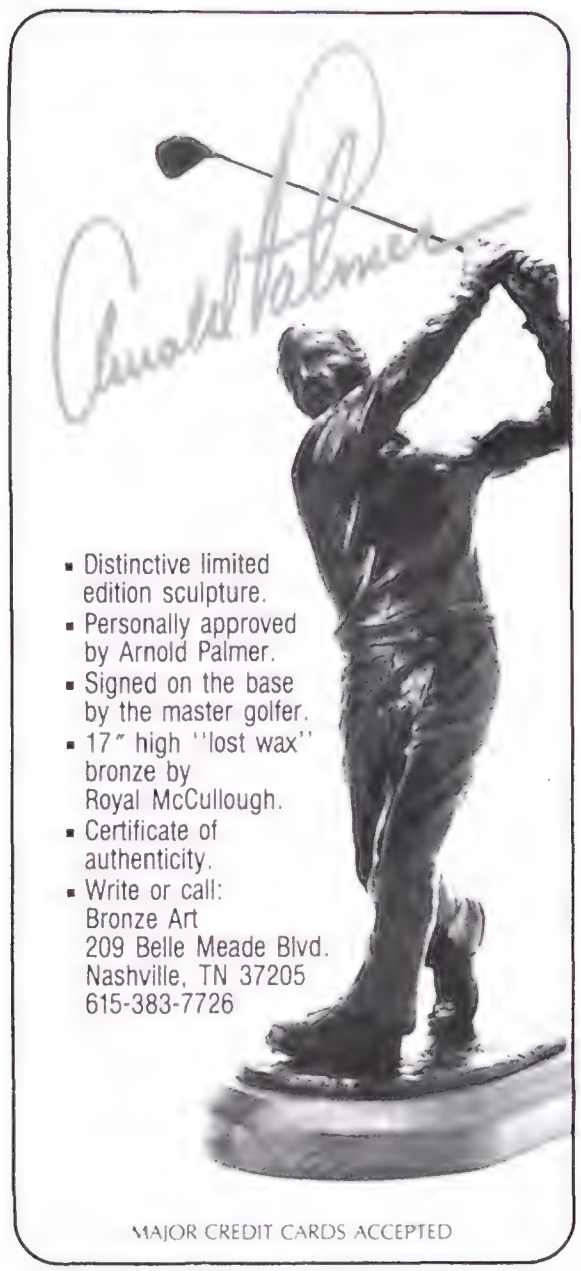

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Letters to the Editor

Meerkats

Dear Sir: I know what that huddle of meerkats in your April issue are doing atop their termite mound . . . they are expressing consternation, bewilderment, shocked disbelief that they were unseated from the front cover of SMITHSONIAN by an unsittable *chair* masquerading as a pop sculpture.

Watch out! . . . foolish front-cover editor, the Kwang Raiders have picked up the pieces and put their game together again. They're out after *you*, and one of these days in some dry riverbed around the Mall, POW!!
Jack Thayer
Dedham, Massachusetts

Dear Sir: The poster is a nice idea but has limited use. I want a meerkat T-shirt, maybe some gift cards. More meerkats!
Margaret Elliott
Alamo, California

Dear Sir: Oh, if our human leaders, and in fact all mankind the world over, could be as helpful to our species as are the meerkats to theirs!
George Herman
Orange Park, Florida

Dear Sir: The lineup of meerkats on pages 58-59, with the stylized stance and facial expressions of high-fashion models, complete with heavy eye makeup and hollow tummies, deserves a full page in *W*.

Furthermore, with anxiety barely concealed by sweet "Miss America" expressions, the two meerkats on page 65 look for all the world like the last two of the five finalists in that contest.
Marjorie Blanchard
Warwick, Rhode Island

Traffic jams

Dear Sir: Let us remember Mr. Henry (Hank) Barnes, who years ago was City Traffic Engineer in New York City. He devised a system in which all traffic was stopped in all directions at intersections so pedestrians could cross either straight forward or diagonally. This effort to help the foot traveler at intersections became known as the "Barnes Dance."
Robert S. Smith, DMD
Manchester, Connecticut
Mr. Barnes introduced his all-red control at intersections in Denver in the late '40s or early '50s. He took it with him to Baltimore and then on to New York City. The District of Columbia adopted it, and certain intersections still trip that particular fantastic. Ed.

Dear Sir: Having escaped the Los Angeles lunatic fringe after 30 years, and the cholesterol traffic flow of Orange County more than ten years ago for the relative comfort of Monterey Peninsula driving, I have a simple cure for the increasing number of automobiles on those stagnant roads. A monorail around Los Angeles, constructed alongside the freeways on property already purchased and not being used, would contribute to a cure for the overwhelming numbers of cars.
Horace S. Mazet
Carmel, California

Dear Sir: Diamond lanes have been in use for many years on the San Bernardino Freeway in Los Angeles County. There are no diamond lanes or high-occupancy vehicle lanes in the city of San Bernardino.
Cathleen Konyn
Riverside, California

The perfect chair

Dear Sir: Doug Stewart does not mention the famous Morris chair, named for William Morris, English poet and art critic. That early 20th-century adjustable contraption was surely more versatile and popular than any later upscale sitting devices.

Although few will remember the musical celebration of the Morris chair in the Ziegfeld Follies of 1919, many will know it from the recent Smithsonian reissue of the songs. Eddie Cantor sings Irving Berlin's catchy tune about awkward Johnny and the girls, "You'd Be Surprised." "At a party or at a ball, I've got to admit that he's nothing at all. But in a Morris chair . . . You'd be surprised!"

Or, in plaintive acceptance of those dry days of Prohibition, Rogers and Akst's "You

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Don't Need the Wine to Have a Wonderful Time (While They Still Make Those Beautiful Girls)," also sung by Cantor: "Why should we care if the wine isn't there?/We still have the sofa and the old Morris chair."

Commodity, firmness and delight—the Morris chair had its full share of those design qualities.

Arch R. Winter
Mobile

Dear Sir: Pound for pound, dollar for dollar, the most comfortable chair in existence is the folding aluminum lawn chair with woven two-inch plastic webbing. Not one chair in a thousand can touch its ubiquitous comfort, particularly not those that reflect architecture's darkest hour.

John Hartranft
Flint, Michigan

Dear Sir: I tend to agree, mostly, that modern designers still cannot make the perfect chair. But one almost did.

In the late 1940s I was plant engineer in a small furniture factory in Grand Haven, Michigan. We produced a Charles Eames chair that is not only architecturally beautiful but structurally utilitarian. The compound curvature of the seat and back fits the curves of the human body so comfortably that, after long periods of sitting, one does not have the feeling that the chair was designed to provide support for a "square box."

Arthur J. Cradit
Hesperia, California

Dear Sir: I consider your April chair cover a "meerkatastrophe."

Darla Hatley
Union City, Tennessee

Michael Heizer

Dear Sir: I was astonished to recognize in this article the area that several million kids read about during the 1920s and '30s. Buffalo Rock was a major part of the Jerry Todd books, written by Leo Edwards. He called the place "Oak Island," and five of his best-selling books for boys took place there. Although writing from 1921 to 1938, Edwards described Buffalo Rock as it was in the 1890s, when he was a boy. The strip mining which destroyed its beauty, except for the part preserved in Buffalo State Park, began during his lifetime.

Ed Mulford
Sanford, North Carolina

Dear Sir: What arrogance! Michael Heizer creates a pile of dirt 3,000 feet in diameter with large earthmoving equipment and then announces that the best anyone in the past could have done was a pile 30 feet in diameter. Consider the ancient Egyptians. All they did was quarry and transport 11 million cubic yards of stone to build pyramids and temples and other things—all without wheels, beasts of burden, or large earthmovers. Do you really think they would be impressed by Heizer's achievement?

I'm not.

Nancy Schlehlein
St. Paul

Dear Sir: The mining sites Mr. Heizer professes to love are dangerous, poisonous and depressingly ugly. It is therefore not surprising that many of his sculptures consist of huge scars gouged into an otherwise pristine landscape.

How interesting that his only reclamation project is apparently one of his loveliest works. It is a great shame that the financial considerations of the agencies involved would not allow him to realize fully his vision of the tumuli.

C. M. Loveless
Baltimore

Downed World War II planes

Dear Sir: The facts surrounding the B-24 picture on page 108 are far more dramatic than your caption would indicate. It is actually a photograph of a plane at moment of impact.

Allied airborne troops were dropped behind German lines in the Arnhem-Nijmegen area on September 17, 1944, and the next day the Eighth Air Force sent 252 B-24s over the drop zones at low level to resupply the ground forces.

Capt. James Hunter was "A-Flight" leader of the 491st Bomb Group. Coming off the target his plane caught a burst of flak in the right wing section. With only seconds to work with, Hunter, considered one of the best pilots in the Group, picked his spot and started to bring the B-24 in on its belly. At less than 50 feet, however, the right inboard engine burst into flames, the right wing dropped and was too low when the plane hit. This instant was captured by a camera in another aircraft.

Hunter actually pulled the plane into the air again after the photo was taken, but by then there was no more room. Hunter and eight others were killed as their aircraft demolished itself against some trees and farm buildings bordering the field. Miraculously, one man did survive: Staff Sgt. Frank DiPalma, who was res-

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cued by Franciscan Brothers, treated by doctors in the vicinity and hidden in a Catholic church until the British Army liberated the town of Udenhout.

Allan G. Blue
Bendersville, Pennsylvania

Keeneland auction

Dear Sir: To have spent 25 years at stud, Northern Dancer would have had to be extraordinarily precocious. He is 25 years old (and has been at stud for 21). Also, Ms. Shell says that Nashua earned perhaps a quarter of a million dollars. One of racing's earliest millionaires, he actually earned $1,288,565 on the track—$37,365 more than his syndication.

E. E. Anderson jr.
Carson City, Nevada

Dear Sir: As a proud native of Lexington I was thrilled to see your feature on the Keeneland yearling sales.

Please inform Ms. Shell that we do offer luxurious hotel accommodations, exquisite bed-and-breakfast homes and a class resort hotel. The most infuriating comment was that restaurants "tend toward barbecue." Of almost 200 restaurants, only three feature barbecue. There are two restaurants in town that were awarded four diamonds by Mobil.

Patricia Cress
Lexington, Kentucky

Mall

Dear Sir: I fear that Mr. Park's childhood saying, "The new moon is sitting in the old moon's lap," had the moons either backward or upside down. When we see the shadow of the old moon rounding out the bright crescent of the new, we see "the new moon with the old moon in her arms." A folkloric ill omen since the 13th century, it was commemorated in the "Ballad of Sir Patrick Spens."

The relevant stanza is: "Late, late yestreen I saw the new moone/ Wi' the auld moone in hir arme;/ And I feir, I feir, my dier mastèr/ That we will com to harme."

Martin Shockley
Denton, Texas

Phenomena

Dear Sir: When I saw the photo of Miroslav Simo drawing his compound bow, I thought he was demonstrating a new prosthetic device. Now I believe he is taking deadly aim at the simple grace and elegance of the traditional longbow.

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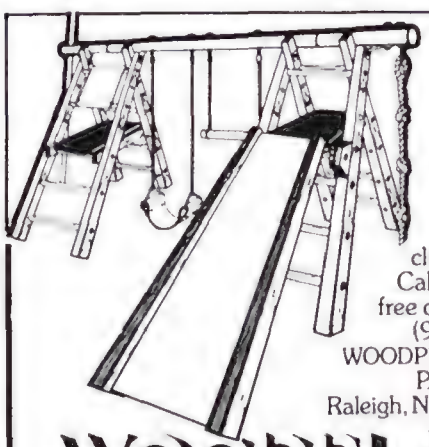

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Rarely have ingenuity and ugliness been so successfully paired.
Jack Troy
Huntingdon, Pennsylvania

Girl Scout cookies

Dear Sir: The girls aren't really decent businesspersons at all. They let themselves get conned into putting hours and hours of effort into what essentially is raising funds for costs and salaries of a well-paid professional staff. Local troops get a very small percentage of the proceeds. The real winners are Girl Scout professionals, bakeries and trucking companies.

If your friendly grocer hired girls of the same age to sell cookies door to door, the Child Labor Law enforcers would have him before a judge so fast his cookies would crumble.

The girls often have trouble keeping their records straight, and parents have to make up the shortage or buy the extra cookies. They also have the privilege of driving the girls around to take orders and make deliveries. The cost in time and money can be considerable.

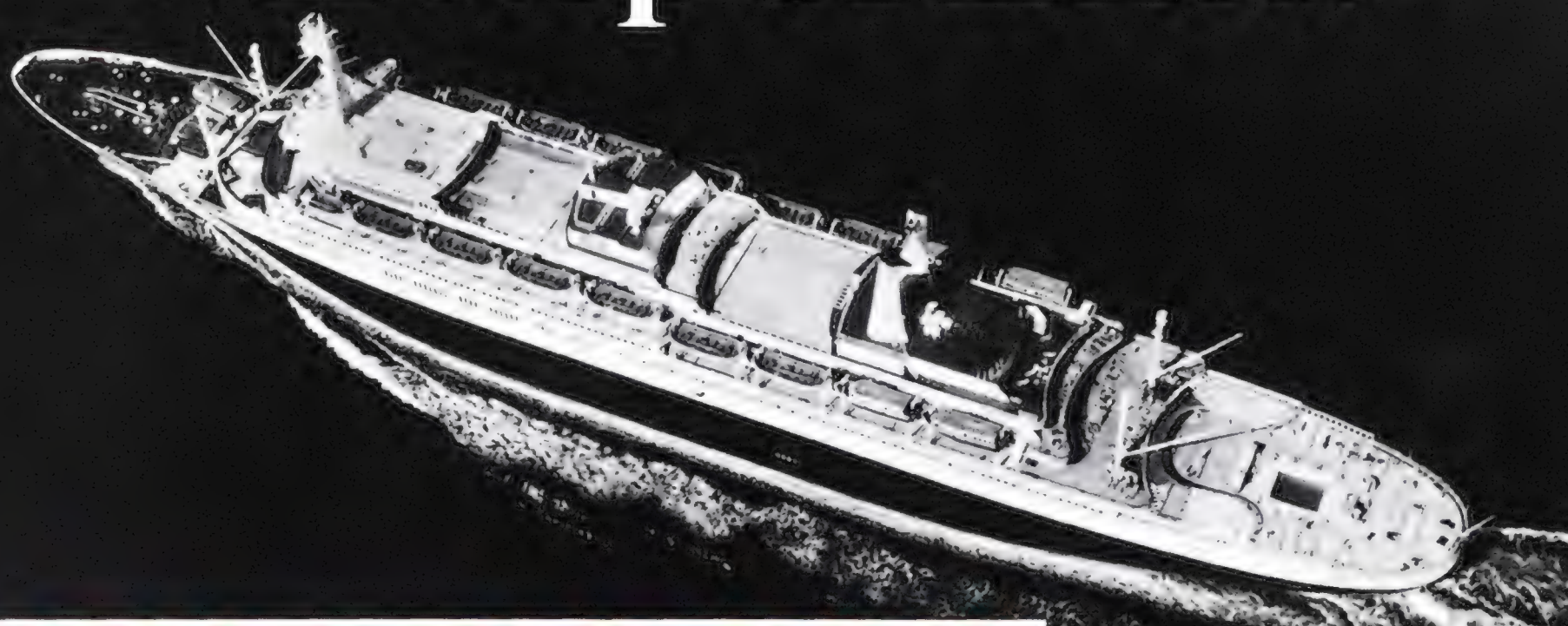
Next time the girl comes around, just pass her a $5 bill and tell her to put it in the troop treasury. It will save wear and tear on both of you, and give the troop about what they'd make on a couple of dozen boxes.
Jerry L. Dumbaugh
Blue Hill, Maine

Dear Sir: Instead of teaching nine-year-olds a standard of quality and accomplishment, as when the Scouts made the cookies, the drive now praises those who peddle the largest number of boxes of an indifferent product with the sole end of bringing in a monster gross of $225,000,000.
Jan Kindler
New York City

Polar bears

Dear Sir: Linda, featured in your article, may be the most studied polar bear in the world and was, until recently, one of the most frequently incarcerated. Happily she and her as yet unnamed cub have found a permanent home far from the Churchill bear jail, in Albuquerque's Rio Grande Zoo. With an able parole board consisting of the Canadian Ambassador to the United States, the Canadian Wildlife Service, and a jury of U.S. Wildlife and Albuquerque zoo officials and local groups, the bears were relocated on April 13.
Pete V. Domenici
U.S. Senator, New Mexico

Next year the World will stop 31 times.



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Around the Mall and beyond

It's an unearthly sound—a constant, uneven whooping that reminds me of the howler monkeys at the Smithsonian research facility in Panama. It's on my tape recorder and it doesn't come from Panama, but from an office building in downtown Washington. It was made not by howler monkeys, but by a dozen high school students, each scraping the sharp edges of a small zinc plate.

They were a class in a Smithsonian Resident Associate outreach program called "Discover Graphics." Intrigued by the title, I set out to do so, and found these young students at work in a seventh-floor studio of the Graphic Communications International Union. They were carrying out the very first step in printmaking: preparing their plates. With a three-sided tool they were scaling off the sharp zinc edges—and producing the weird, vibrating sound. Sharp-edged plates would cut the blankets that are squeezed down on them in the printing process.

A union building seemed a strange kind of place to find a Smithsonian Associates class. Not so when you realize that Discover Graphics was saved from extinction partly by the generosity of the Graphic Communications International Union, which is, of course, vitally interested in keeping the old skill of printmaking alive. "In fact, in 1974 and '76 the Union conducted printmaking demonstrations as part of the Smithsonian Folklife Festival," says Elizabeth McClung, RAP program coordinator for studio arts and enthusiastic director of the Discover Graphics project.

Printing demonstrations (of type, not pictures) have also been taking place on a steady basis at the press display over at the Museum of American History. That museum—back in the days when it was called the Museum of History and Technology—was also home to the first high school graphics exhibition, held by the Graphic Arts Division there in the late 1960s. It was that exhibit which provided the impetus for a printmaking day at the National Collection of Fine Arts (now the Museum of American Art). That day, in turn, evolved into Discover Graphics—a training program for high school art teachers and their students—which operated with considerable success for about ten years at American Art. But the program was costly and space was at a premium. So in 1982—just as I was preparing a column on it—printmaking came to a grinding halt.

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Enter Janet Solinger, Director of the Resident Associate Program. To Janet's eye, printmaking was right down RAP's broad and capacious alley. The Smithsonian's Special Educational Outreach Fund pitched in some dollars. The Smithsonian Women's Committee came through with several of their own, and the District of Columbia Commission on the Arts and Humanities coughed up a few more. So did the Stephenson Inc. printing firm of Alexandria, Virginia.

The aforesaid Graphic Communications International Union jumped in with studio space, and a local newspaper group shouted for ink and related supplies. Finally, Scip Barnhart, a master printmaker who teaches at George Washington University and also at the famous Corcoran School of Art, agreed to do his stuff.

So Discover Graphics got back off the ground. The first show of student prints, two years ago, was a smash hit. The third exhibition is just getting under way as you read this and will be on view until early August. It will be held, appropriately, right where the whole interest started in the first place, in the Museum of American History.

What you will see, down in the lower-level gallery that adjoins the museum shop, is the best student work of the 1985-86 season: 45 selected etchings and lithographs, the results of intensive effort by young people from 12 metropolitan-area public high schools. The program gives art students four full-day sessions (one a week, that is) to learn this highly disciplined craft. They go at it from 8 in the morning to 1 P.M., then they break for lunch and a visit to a gallery or a Smithsonian museum—the Freer, perhaps, or the Museum of American Art—and sometimes the opportunity to watch an artist at work in his studio.

Their own studio remains open on Saturdays so they can keep at it if they're eager—and most of them are. This, however, was a Monday, and I found myself with a beginning class—seven boys, five girls, mostly juniors at McLean High School in Virginia. Their art teacher, Mary Young, had been through the summer course that puts teachers a step ahead so they can help Scip Barnhart. The students themselves also help teach. Those who finish a step in the process pass on their knowledge to those beginning it.

I found the first step in discovering graphics slightly tedious. The edges of those plates take a lot of scraping, filing and burnishing with oil before they're smooth enough not to trap ink and give you a funny-looking border. But things begin to look up when you paint the "ground" on your plate. It's a mixture of beeswax and a thin tarry substance called asphaltum, impervious to acid, and it goes on like ship's varnish.

If you've ever done a boat's "brightwork," you'll recall that bubbles in your varnish are a disaster. Same here. Bubbles in the ground will allow acid to get in and leave spots on your magnificent work of art. Scip showed us how to blow on the waxy glop and break the bubbles. "Blow, don't spit," he warned. Spit leaves a nasty mess on your plate.

Prepared plates with ground take a while to dry and harden, so once all 12 were finished Scip called it a day and went off with the students to a museum. He told me that I could drop in again on Wednesday when his other class would be making their first prints.

I arrived too late to see this group (from Old Mill High School in Maryland) transfer the drawings they had prepared onto

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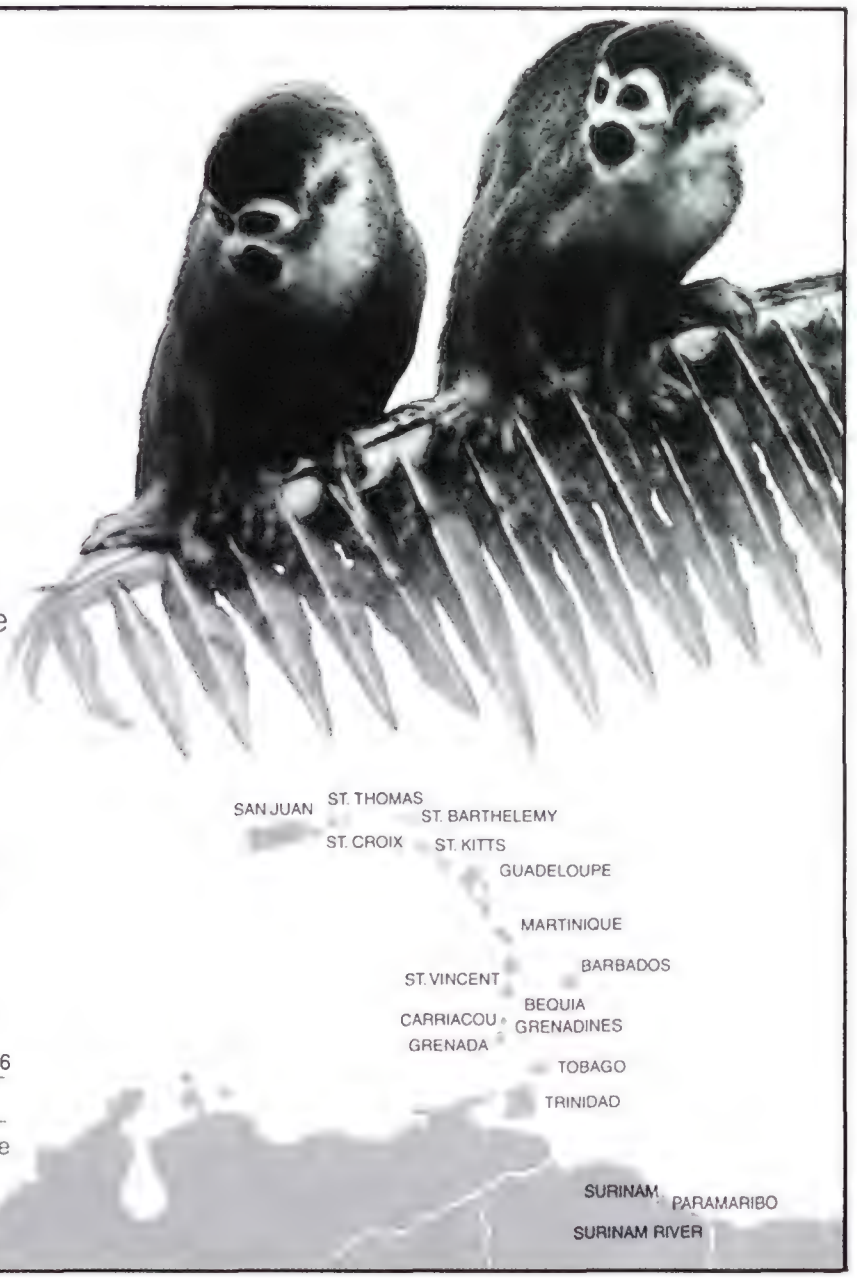

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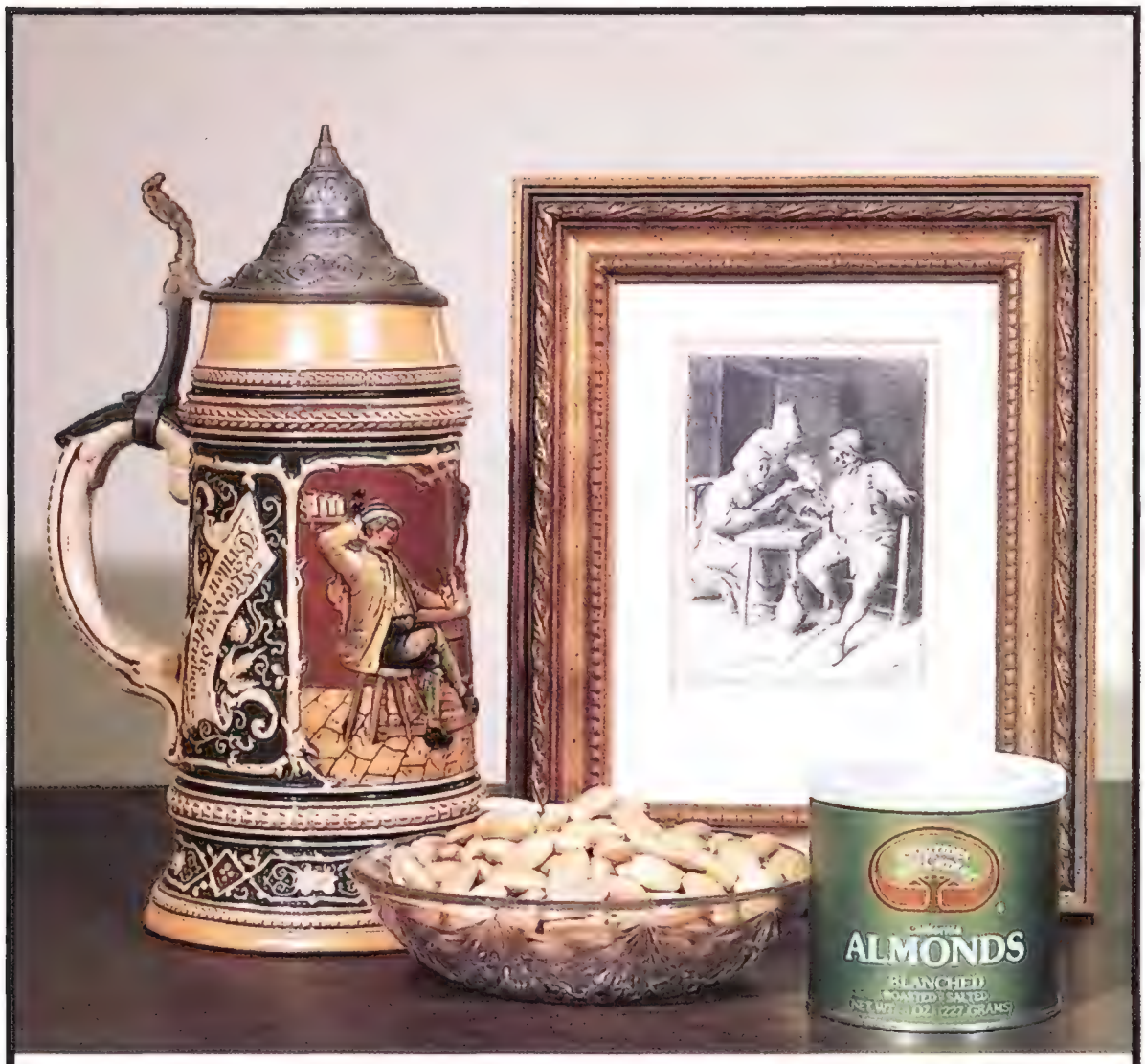

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their plates with red iron-oxide paper. This leaves lines on the ground, and I watched the group follow the lines with etching needles. You just trace your drawing; your needle bares the zinc so the acid can reach it and etch it. Wherever the ground remains, the acid cannot penetrate.

Next step: dunk your work of art into a bath of nitric acid diluted, ten to one, with water. The trick is to swish the solution over the plate with a feather. This keeps it moving and prevents those messy bubbles from forming, this time from the action of the acid. You keep it up for 20 minutes. If you're a high school student the time passes quickly because someone always brings some good tapes to play very loudly while you work.

At last you can pull out your plate and rinse it off and then clean the ground off it with a solution of alcohol and lithotine, which, says Scip Barnhart, is like turpentine only gentler. Your plate emerges nice and shiny, but this time etched with the lines of your drawing. Now you put on an apron and smear ink all over the newly etched plate—a splendidly messy task accomplished with spatula and dabber. When the ink is well into those acid-etched lines, you wipe it clean with rags and finally the heel of your hand.

Having gotten yourself beautifully dirty, you must now get surgically clean. Then you fish a piece of 100-percent rag paper out of a bath of water where it's been soaking to get its fibers loose and spongy. You

Aquatint by Bill Abbott, of James Robinson High in Fairfax, was shown in first Discover Graphics exhibit.

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Lisa Ruyter, Montgomery County Visual Arts Center, used layers of aquatint to achieve deep blacks of print in 1986 show.

lay it between sheets of blotting paper and press it damp-dry with a rolling pin. Then put a sheet of newsprint on the bed of the press, lay your inked plate on that, face up, center your blotted paper on top of it, put another sheet of newsprint over that, pull a series of felt blankets over the whole business and turn the crank.

The heavy steel roller rides over the blankets, pressing them down, and then becomes hard to crank. It's reached the plate, and you need two hands to beef it across. Your excitement mounts. I know because I watched the young faces at the press, all of them trying very hard to remain properly cool.

When you've cranked the roller beyond the paper, you stop. So does your heart while you peel off the blankets, scrap the newsprint and remove your print. And there it is—your own drawing neatly reproduced. You do three of these intaglio prints, then show others the steps you've taken. And in the weeks ahead you'll learn things like drypoint, when you draw directly into the zinc with the etching needle, plowing up the metal so that it winds up creating a blurred line—and aquatint, when you spray your cleaned, etched plate with a densely speckled layer of enamel paint and then immerse it for varying lengths of time in the acid bath to create different tones of gray on your print.

I think Discover Graphics is here to stay this time. I hope so, after seeing the light of discovery in those teenage eyes.

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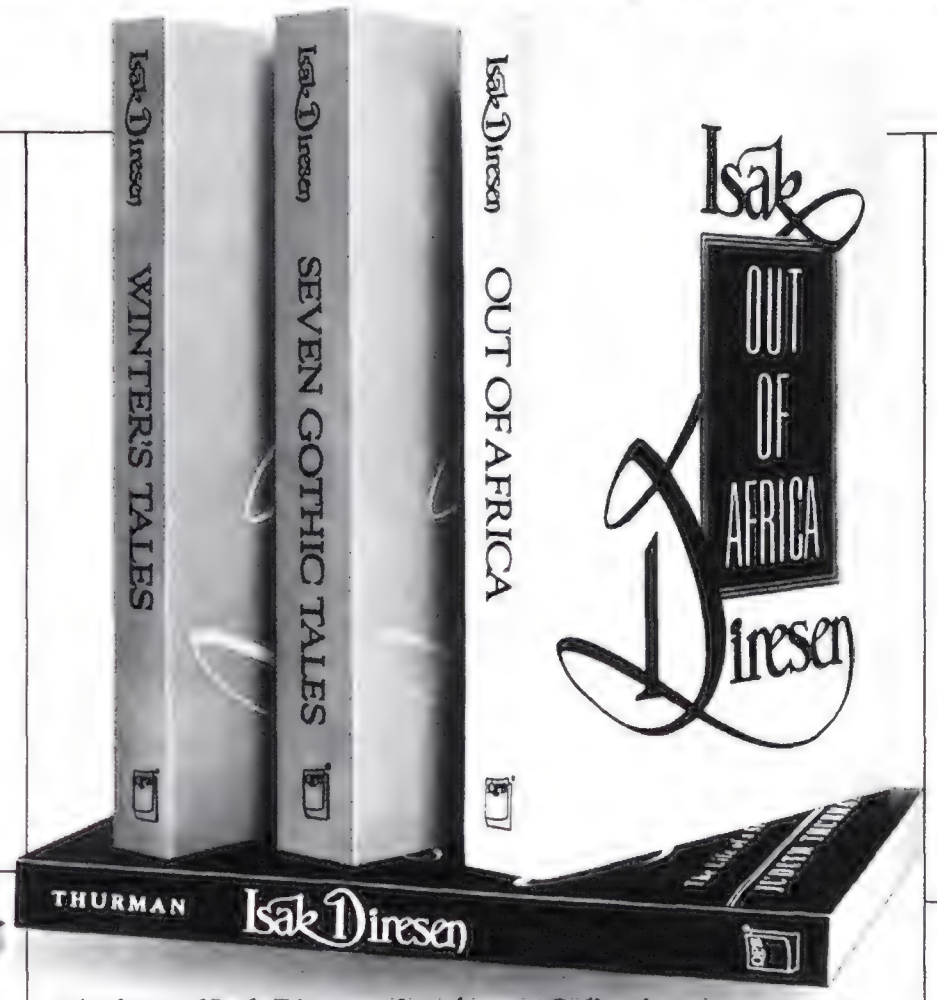

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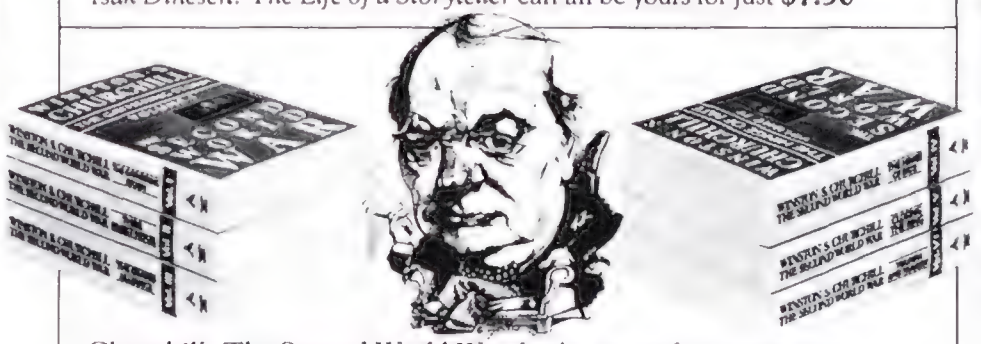

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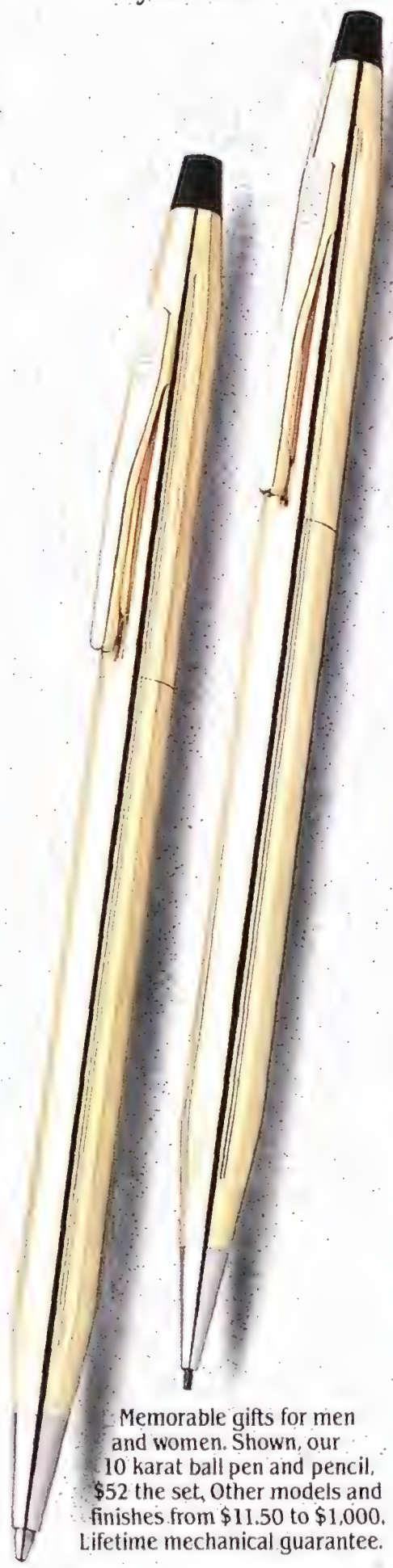

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Phenomena, comment and notes

The Nature Conservancy is now involved in ripping out vegetation in Nebraska—for a creature that does not like surprises

The moon is gibbous, shrinking toward last quarter, hanging in the southwest like a lantern after the party is over. A promise of light touches the eastern horizon. Four of us are in a black car, the bulbs removed from its back-up and interior-dome lights, driving down a dirt track just barely visible in the moonlight.

We are on Mormon Island, in the Platte River near Grand Island, Nebraska, driving west, upstream, in the dark. Along the river to our left we can hear a chorus of vibrato croakings, a sound like giant insects rasping their legs together. We are paralleling the river channel, headed for the tip of the island where the river divides around it. After what seems like a couple of miles, the car stops. We slip out, careful not to let the doors slam, and duck walk across an open field to the river, crouching until our legs burn. When our leader stops, we stop, faces down, trying to be invisible in the grass. We squeeze through a barbed wire fence and tiptoe through the back door of a plywood blind.

In front of us, visible through slashes in a burlap curtain, is the river, cold and dark, a shallow flow through a maze of sandbars. Other sandbars lie an inch or two below the surface, and standing on these, packed together like guests at an exhibit opening, are hundreds—surely thousands—of a bird I have never seen: sandhill cranes.

The cranes look gray and cold, too, in the early light. They are big, standing three feet and taller on their black legs. A few are still asleep, heads tucked under wings. But most are stirring, stretching, preening. Every so often one will spread its wings and hop a couple of feet into the air. Others go into courtship dances, bowing to their partners with heads held low to the ground, stimulating their partners and themselves so their reproductive organs will enlarge and become functional by the time they reach their breeding grounds, which are hundreds to thousands of miles to the north.

At least 200 birds are standing on a submerged bar directly in front of us. Many times that number are massed on other bars up and down the river. The noise is constant, sometimes rising in a crescendo like the crowd at a game heard from outside the stadium, sometimes achieving an underlying rhythm like the breathing of

Sandhill cranes flock to shallow waters of Platte River every spring, roosting there by night, feeding in wet meadows and farm fields by day.

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When your grandfather (or great-grandfather) dropped by to visit his friendly banker, chances are that the original of this *Banker's Lamp* stood on his desk.

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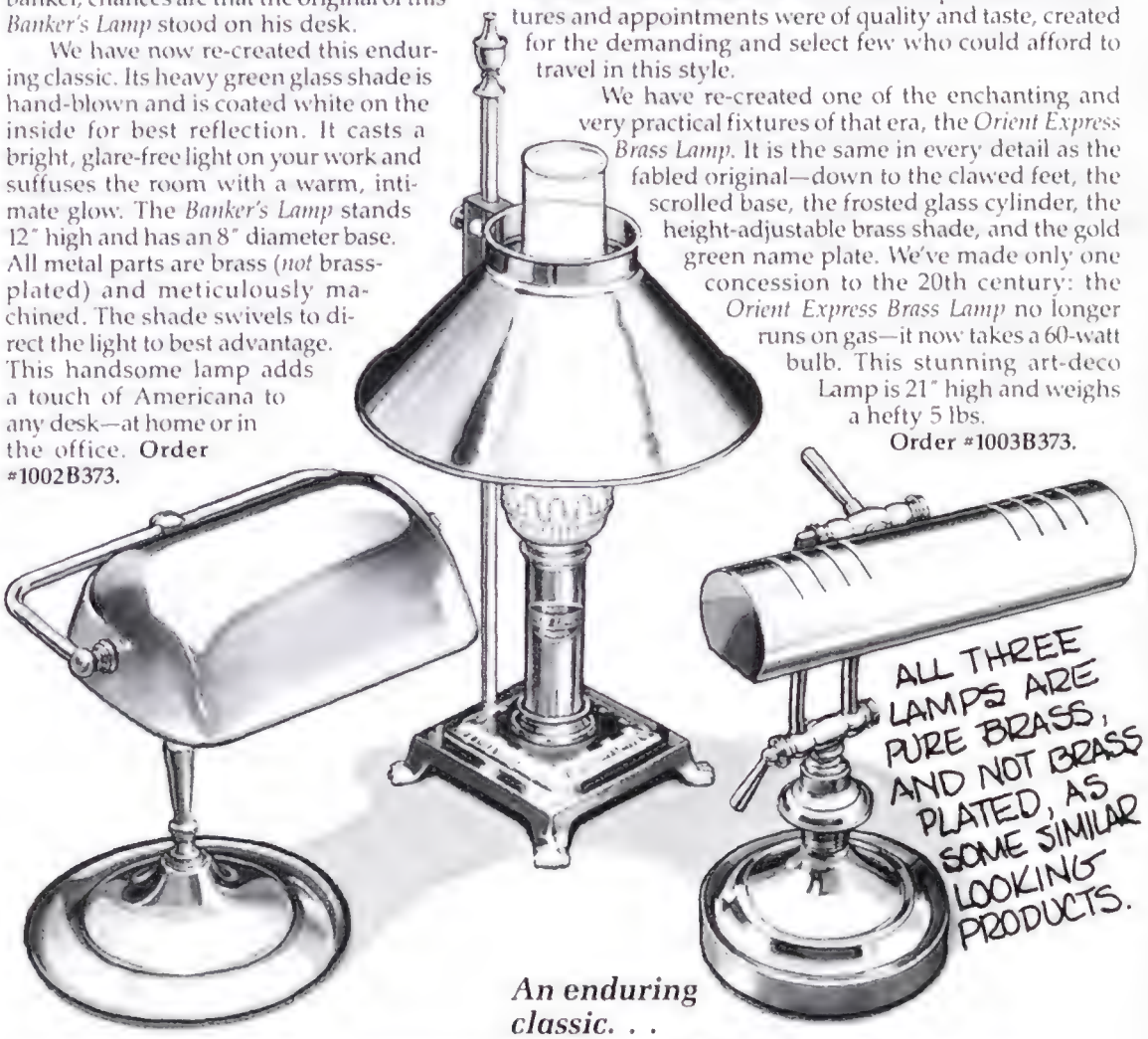

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some superorganism. Mixed with the hoarse squawks and croaks are high-pitched peeps, the calls of last year's young, now as large as their parents but not yet mature.

Soon, in twos and fours, the birds begin to leave. They stretch their necks into the wind, flowing gently downriver out of the west, until their necks and backs form a perfectly straight slope, and take off with the strong, slow flaps of a great blue heron. They fly upstream until well into the air, then turn to the wet meadows along the river where they may feed on worms and snails and other invertebrates before continuing to the cornfields.

The sun appears over a distant tree line, washing warmth on the cold sand. For the first time we can see the crimson bare patches on their foreheads. My companions, I realize, are searching through the crowds of gray cranes for any that are white: the extremely rare whooping crane. They normally follow the sandhills by several weeks, however, and we do not see any this day.

Sandhills are everywhere. Densities on this stretch of the Platte can reach 20,000 per mile. During a six- to eight-week period in March and April, an estimated 350,000 cranes stop here on their way north; another 150,000 choose the North Platte. Individual birds stay three to four weeks, building the energy reserves they will need for the trip north and the breeding season. But for a sandhill crane, on its way from the Gulf Coast to the tundra and islands of the Canadian Arctic and even Siberia, the Platte is not what it used to be.

Once the river was the proverbial mile wide and an inch deep. Braided channels threaded their way through countless sandbars. In the spring, snow melt and grinding ice would scour the banks and the sandbars, cleaning off any vegetation that had managed a foothold. What might have struck my eye as barren and downright uninviting apparently was just what the cranes look for: a place to roost where they can see hundreds of feet in any direction, making it nearly impossible for a predator to stalk them. Sandhill cranes prefer to roost on shallow, submerged sandbars where they can see 250 feet all around them, although they will settle for 75; whooping cranes want even more.

Today about 70 percent of the Platte's flow is diverted, mostly for irrigation; the river is only a trickle of its former self. Later that day we flew a light plane up the river to Kearney and beyond. We could

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see rows of trees where branches of the river had once flowed, and dark, sinuous curves in the middle of cultivated fields clearly showed where channels had once been. Cottonwoods and willows crowd the banks and push out onto the islands. In some places along the banks and on sandbars all the trees and brush had been cut down.

A century ago the cranes stopped along 300 miles of the Platte on their northward journey; now they are concentrated in 30 miles. It makes for a spectacular sight, drawing birders from all over the country. Such a concentration is dangerous for the birds, however. A violent storm, a sharp decrease in food stores or a toxic spill could wipe out the bulk of the population in one fell swoop. And the concentration is too high for the birds themselves. Scientists worry that some might drift south to feed in the Rainwater Basin, which has its own dangers. More than 90 percent of the wetlands there have been drained, and the few that are left are plagued with avian cholera; in 1980, as many as 80,000 water birds may have died from this scourge that accompanies overcrowding.

I was there with people who are trying to turn the situation around. John VanDerwalker is executive director of the Platte River Whooping Crane Habitat Maintenance Trust. Once a biologist and diver with the National Marine Fisheries Service, risking his life among the rocks of the Columbia River and on the headrope of a deepwater trawl, he is now devoted to water only inches deep. Ross Sublett spent eight years buying land for the Washington, D.C., Metro system; now he buys land for the Great Plains Field Office of the Nature Conservancy, far from his beloved Chesapeake Bay. Krishna Roy is a native of India who came to the Conservancy by way of the University of Michigan. All three are in it for love.

The plan is to spread the cranes out again, to make more of the Platte attractive to them. From a typical flying altitude of 300 to 500 feet, a crane can see about four miles in any direction. Thus, if habitat managers can arrange an attractive roosting area every eight miles along the Platte, any bird flying over the river in that stretch will find one. Specifically, they want to acquire a core of 640 acres on each eight-mile stretch of the river, and easements to produce a buffer zone of almost 2,000 acres around each core. They want to do this for 80 miles of river, producing ten such areas. Hence the plan calls for acquisition of 25,000 acres: so far, they have acquired 6,000.

Once acquired, the land is managed specifically for the cranes. The cottonwoods and willows are removed, the banks and bars returned to the original bareness the cranes require. Stripping land is not an activity I normally associate with the Nature Conservancy, and I never thought I would applaud such clear-cutting, especially in a region where trees are hard to come by in the first place. But from the air you can see the dim outlines of what the river once was, and from the blind you exult that these ancient birds still thrive. If they need a long line of sight on a few miles of river while they stoke up for the breeding season, I'll turn my back on all my instincts, grit my teeth and pick up a brush hook.

I couldn't get enough of them. The afternoon before, I had come to a smoking halt on the shoulder of Interstate 80 when

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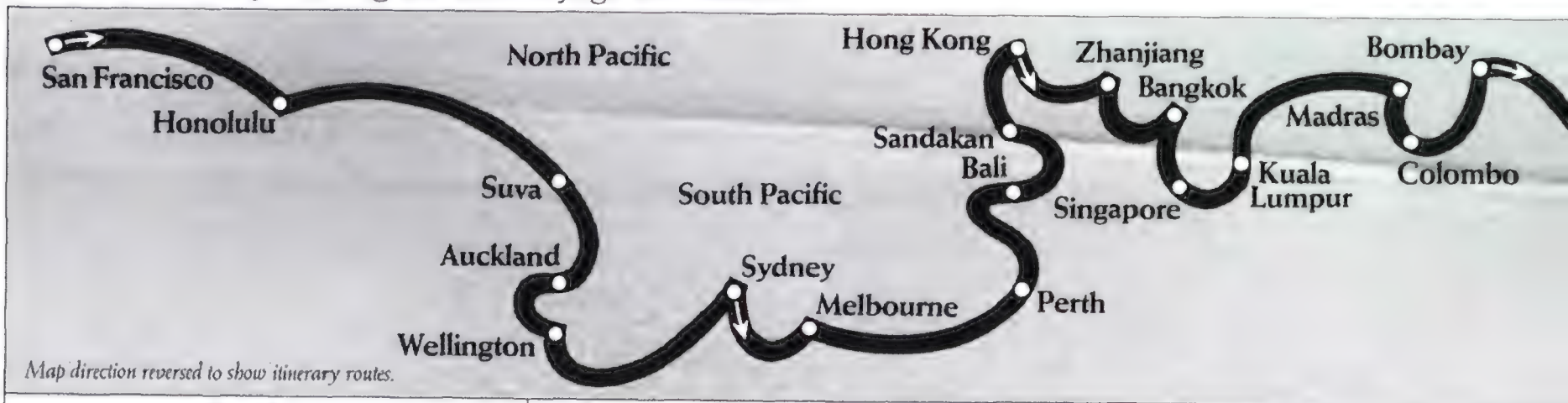

Map direction reversed to show itinerary routes.

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I realized those were cranes I was looking at in a cornfield. I checked in at the appointed motel, then raced out again. I tore up and down the grid of back roads looking for cranes until I noticed what looked like a flight of geese well to the east. I parked, hopped out and held my breath as flight after flight of cranes—wavering strings of 25, 50, even 120—flew back to the river after a day of gleaning in the fields. Several hundred feet overhead, calling constantly to each other, the birds would swing north or south of me as though I reached up into their airspace, then circle down into a wet meadow next to the river behind me.

This day was to end immersed in cranes. In late afternoon, as the birds were just beginning to head back to their watery roost, we drove out on Mormon Island again, this time to an observation bunker built (partly) with money sent in spontaneously by children who had read about the place in *Ranger Rick*. We parked at a discreet distance from the river and walked as inconspicuously as possible up to the bunker. Everybody stopped dead when a dozen very large birds, all white except for black on the wings, wheeled in over our heads and landed in the river, but they were white pelicans, not whooping cranes.

To the north we could see immense flights coming toward us. They would hesitate at the interstate, flying briefly east and west while they gathered their courage, then cross in a rush and come gliding toward our spot on the river. They formed an orderly traffic pattern, flying in a huge, slow-moving clockwise circle until birds would break off in groups of three and six and start their glide path, legs dangling, dropping onto submerged sandbars with only a few last-minute wing flaps.

To the east we could see birds fly out of the south until they hit the river, then turn west to fly up the river past us. Birds would fill up one sandbar and then begin another one, long after it was too dark for us to see where the water was shallow. Slowly the scene we had watched at dawn took shape in reverse before our eyes: the river filled with solid banks of birds, sociably vocal, settling in for the night.

We waited for full darkness, then tiptoed out of the bunker, walking quietly back to the car. Six stragglers flew over our heads, very low, calling in the dark. They did not see us. We were seeing the Platte as it had been, and will be again.

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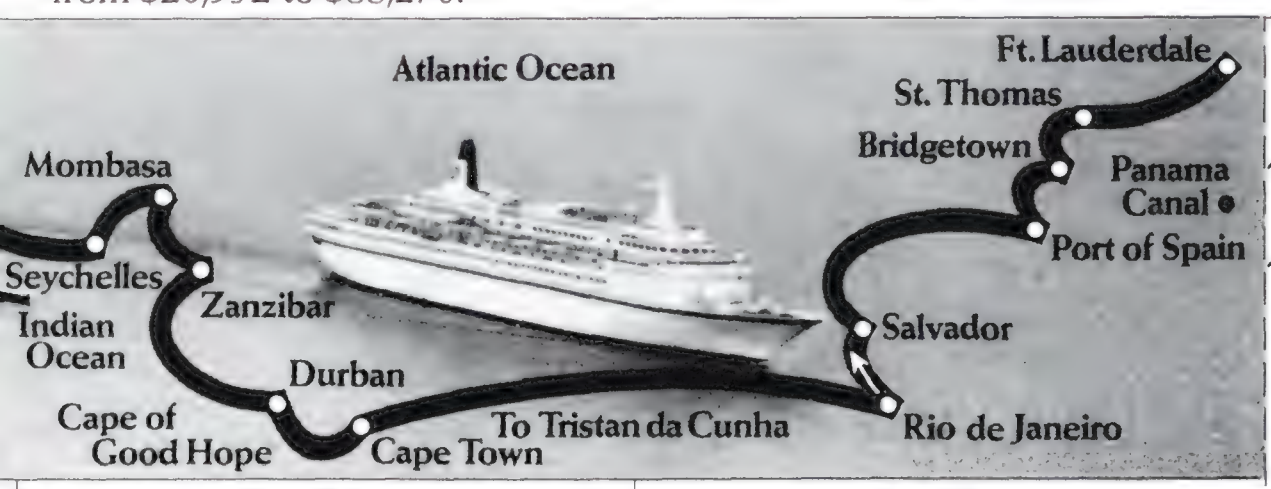

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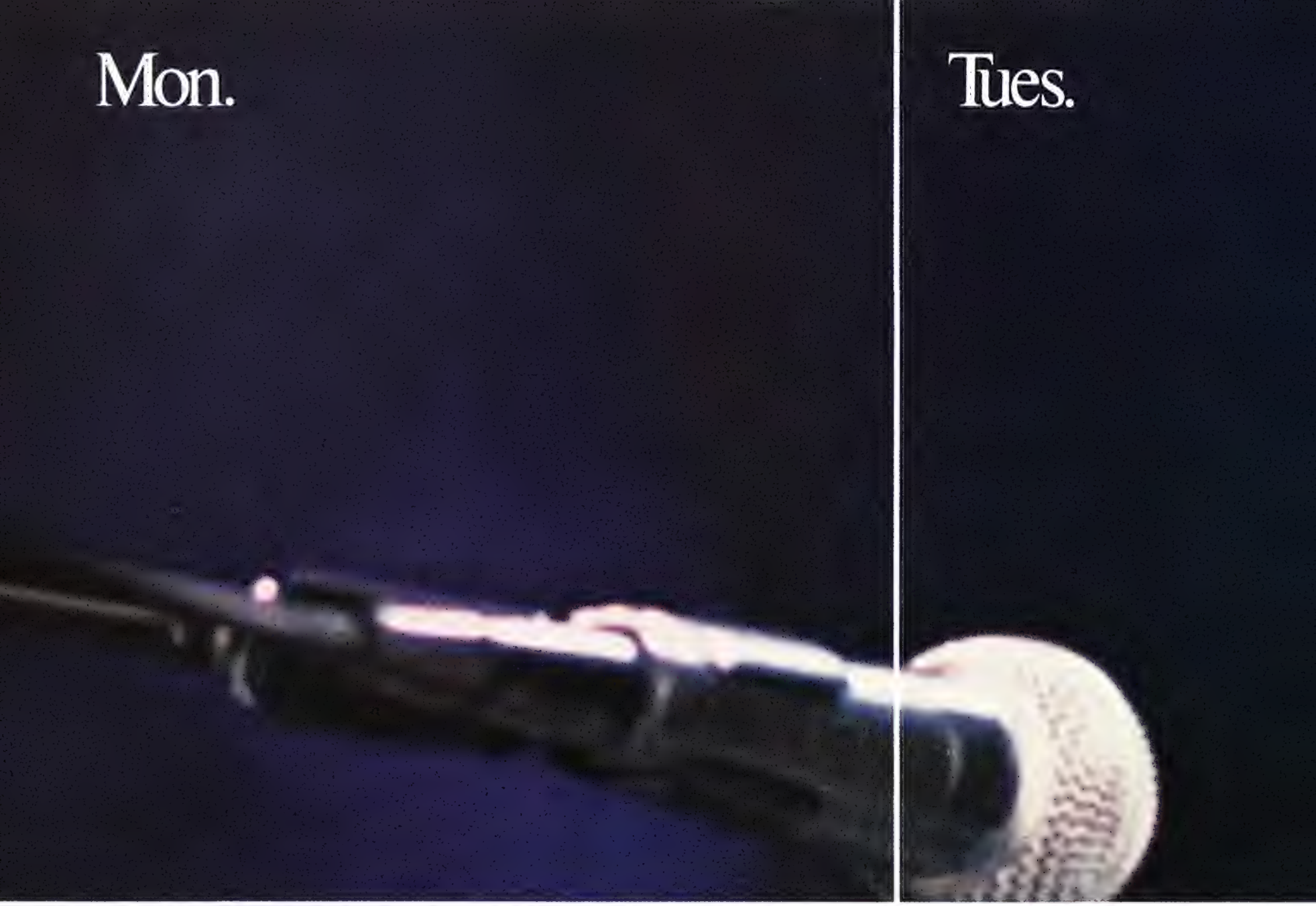

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Points of origin

Caps and gowns are still colorful, but gone are the wrestling, dancing and drinking that graduations once inspired

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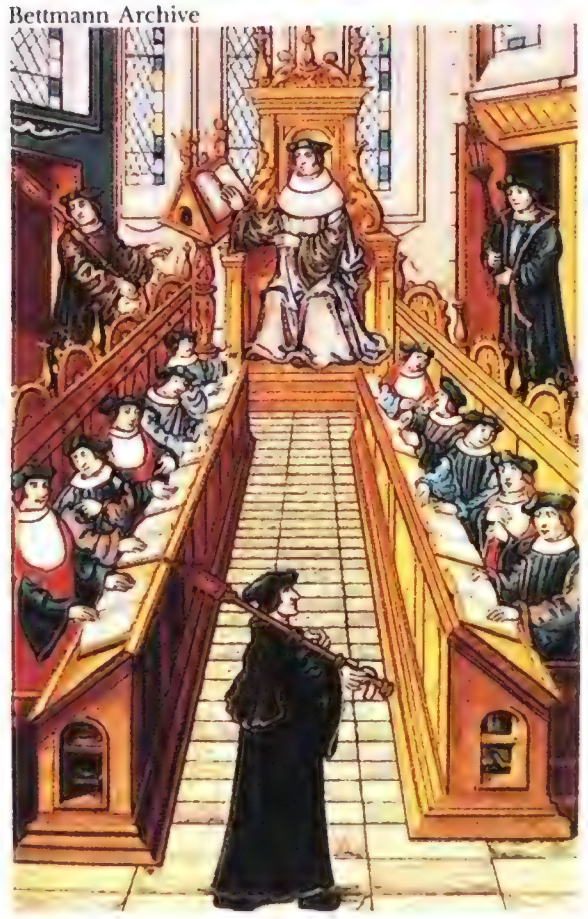

At University of Paris, teacher and robed scholars, seated or standing with ornate scepters, make academic points, circa 1400.

Dignified and stately as are contemporary commencement ceremonies, they are a civilized substitution for any number of events that youths once had to endure before they could be counted among the elders of a tribe or clan. Equivalent to vanquishing a fearsome opponent or surviving a solitary initiation, the academic rite of passage is society's acknowledgment that a youngster has passed an important hurdle in life.

Degree ceremonies have been with us a long time, since the mid-12th century at the University of Bologna, and shortly thereafter at Paris, Oxford and Cambridge. The rites and dress to be seen at graduations all across America this month reflect ancient and honorable customs. Even the words used have changed very little.

In Latin, *gradus* meant a step, and *degradus* a step in an ascent or descent, a rung on a ladder. From the first we get our word "graduation"; from the second, "degree." The sense of both words is closely connected to a step or a stage in life, not at all a resting point or climax but a beginning—a point that graduation speakers will be addressing, *ad nauseam*, this month.

Although graduation is the term most generally used, the word that most closely approximates the original sense is commencement, the Cambridge University term for the ceremony of conferring master's and doctor's degrees. At Oxford, the ceremony was called The Act.

Those seeking Cambridge degrees were known as inceptors (or beginners) and commencement is derived from this Latin term. Americans often use the word commencement because the first American college to have one was Harvard in 1642. Since John Harvard was a Cambridge man, the Cambridge expression was adopted.

The graduation ceremony, originally consisting of two parts, has been greatly reduced since medieval times. The first part conferred the preliminary license to teach, or bachelor's degree. This was followed six months later by the candidate's inception and first formal lecture, or disputation, before the assembled faculty. After that, he received the teacher's cap (biretta) and a token book in recognition of his scholarship in reading, thinking, lecturing and disputing. That is why a book is still the perfect graduation gift, and why Harvard, even in its early years, gave each graduate a book (which had to be returned right after commencement).

America's big change was that commencements (inceptions) were mainly for those taking the bachelor's degree, like the nine graduated from Harvard in 1642 and a handful more at William and Mary in 1700. Back at Oxford and Cambridge, the B.A. remained merely a step on the road to teaching, which could only begin in full with a master's degree.

As for the meaning of bachelor and baccalaureate, their history is hopelessly confused, probably because so many well-meaning but amateur etymologists have had a crack at it. Even the redoubtable Dr. Johnson was wrong in his *Dictionary*, when he derived "bachelor" as a combination of

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bacca (Latin for berry) and *laurus* (laurel). Said he: "Bachelors being young are of good hopes, like laurels in the berry."

Another equally wrong but nonetheless satisfying derivation insists the words came from the French *bas chevalier*, those young squires in training who were forced to sit "below the knights" at table.

Much more likely is that both bachelor and baccalaureate came from *baccalaria*, a small unit of land, and *baccalarius*, the Latin term for the impoverished tenants who worked such lands. So, beginning farmers rather than fledgling knights is probably the original sense.

Earning degrees through written examination is a modern practice. Originally, the graduation ceremony and the final exam were rolled into one. The examination part was called the *viva voce* (with the living voice) and was undertaken in full academic dress before a hall full of examiners and guests. And when degrees were won by reading a thesis, this was followed by the answering of questions not only on the subject of the thesis but also on any other subjects the examiners might expect a university graduate to be familiar with. The B.A. candidate had to dispute a series of published questions and topics.

Disputation became an important part of Colonial graduations in America. But here it served as an initiation ceremony, especially for those who never intended to teach. Lists of graduates and the topics they were to dispute were printed each spring. At Harvard in 1743, young Samuel Adams argued the affirmative on the question, "Is it Lawful to resist the Supreme Magistrate, if the Commonwealth cannot otherwise be preserved?" How King George III would have loved to get his hands on the tutor who put Sam up to that proposition!

In England, the Oxford Act and Cambridge commencement became such fixtures of the social season that the best people wouldn't miss them for the world. And neither would the worst, apparently. In 1602, for example, the Oxford festivities saw a "great confluence of cutpurses . . . first Master Bodley lost his clock, Sir Richard Lea two jewels of 200 marks . . . and divers other lost good sums of five, eight, and fourteen pounds . . . and one mad knave whether of malace or merriment took the advantage to pull off a gentlewoman's shoe and made the goose go home barefoot."

At Harvard, commencement became the highlight of the summer and typically lasted several days, with entertainment, wrestling, banquets, dances and a great deal of public drinking.

It was so much fun, in fact, that there were cries for commencement reform. But it took the Revolutionary War to accomplish that as the growing popularity of July 4 Independence Day celebrations crowded graduation week off the calendar.

Academic costumes in general come directly from the common modes of dress in the late Middle Ages and Renaissance. Nearly all are made of black cloth, with the exception of some doctoral gowns. The Oxford Doctor of Philosophy, for example, wears scarlet cloth with blue silk sleeves and facings.

Sleeves are key telltales. The bachelor's gown has long pointed sleeves that extend halfway to the hem of the garment. The master's gown has oblong sleeves open at the wrist, with a long, narrow pouch cut out of the cloth. And the doctor's gown has full bell-shaped sleeves with three bars of black velvet upon them.

High school commencements have only been conducted in cap and gown since 1908. To distinguish them from the B.A. costume, the gowns were designed with short full sleeves.

Perhaps the most important element of academic regalia is the hood. The colors on the doctor's hood indicate not only the wearer's field of study but his or her school as well. For example, throughout the United States, if the hood's velvet facing is green, the degree is in medicine. If dark blue, philosophy; orange, engineering; yellow, science; and so on through the rainbow. Likewise, the color of the hood's inner lining indicates the school.

Today's scholastic cap began to appear in the 16th century. In the Scottish universities, the trencher or square cap was called the John Knox cap or cater-cap, a reference to its four sides. The name trencher cap arose because the hat resembled an inverted serving board, a trencher, with a bowl upon it. Calling the whole a mortarboard is comparatively recent, first recorded in English as late as 1854.

With so much choice in academic fashion, abuses began to appear in no time at all. Dress had to be regulated at the University of Toulouse in 1314 because the competition in gowns and hoods had become a hindrance to education. Many poor scholars had to leave school because they were pawning their books to buy cloth and pay tailors. So the university rector set a ceiling price of 20 solidi for any gown. For people newly admitted to de-

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grees, it was allowed that if they were unaware of the law, they might wear their overpriced new gowns for exactly one month. After that, they had to follow the same dress code as everyone else.

Earlier, at the University of Paris, new inceptors had to agree to a long list of requirements. Among them, to deliver lectures in the great round cope or cloak; also, to "incept in your own cope, not one borrowed or hired."

Academic dress codes have long been with us. In America, colleges met in 1895 to resolve such matters. They met again in 1932. Part of their mission was to settle once and for all the silliness about the position of the tassel. The PhD's golden tassel, they suggested, should be fastened to hang over the left side of the mortarboard. If it was fastened at the center of the cap, however, its location should be determined by the whims of the local breezes only. The persistent rumor that the tassel should be moved to the left side of the cap just when the degree is conferred has, they said, "no warrant in precedent or in common sense."

What is far more important is the first donning of the gowns themselves, still a fine point of the Oxford degree ceremony. This always takes place in the great Sheldonian Theatre, designed by Sir Christopher Wren in 1667. It's the perfect setting for a ceremony shrouded in medieval custom, under a vast ceiling painting by Robert Streater that depicts Ignorance being cast out of heaven by Truth.

After the candidates "supplicate" for their degrees (that is, are presented a few at a time to the university vice chancellor), they leave the Sheldonian by the side door, rush to the nearby Divinity School, put on their new gowns and hoods and then reenter the building by the main entrance, where they are again led to the vice chancellor. To him they bow for the first time in the robes of their new degree. And then it's right out the side door again.

Very dignified and stately, indeed. And not at all like what happened in this very same building in 1809. That June, out-of-work playwright and out-of-office politician Richard Brinsley Sheridan had been turned down for an Oxford honorary degree. Although crushed by the refusal, he came to the Sheldonian anyway and headed toward the guest seats in the balcony. When the students saw him, they immediately set up the cry "Sheridan among the doctors! Sheridan among the doctors!" until Sheridan, beaming from the acclamation, was offered a seat among the honorees.

Michael Olmert

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Facing heavy resistance from two North Vietnamese battalions headquartered inside the Palace of Supreme Harmony, U.S. Marines outside the Citadel fight to regain control of Hue during 25-day-long battle.

By David Alexander

Reviving Hue—Vietnam's broken heart on the River of Perfumes

Ravaged by war and nature, the hauntingly beautiful buildings and tombs are slowly being restored—but the money just isn't there

For 25 days, rockets, bombs, napalm, howitzer shells and mortar rounds were directed at the walled Citadel of Hue, Vietnam—former imperial capital of the country from 1802 to 1945—by combined American and South Vietnamese forces. The fighting had begun after two North Vietnamese battalions had caught defenders unprepared, sliced into the core of the Citadel and set up a command post in the columned throne hall of the building in which the Nguyen emperors had once

Color photographs by John Everingham

Noon Gate, the emperors' entrance to Imperial City of Hue, received heavy blows during the Tet Offensive, especially its east wing (p. 52). South Vietnamese workers repaired worst damage before the war ended.

received their subjects. The building was called the Palace of Supreme Harmony.

The fighting at the Citadel started on January 31, 1968. The residents of Hue had expected the events of this day to be the most festive celebration of the year: the launching of Tet, the lunar Year of the Monkey. Instead, it became a nightmare—one of the bloodiest actions of the Vietnam War, with 5,113 Communist troops, 384 South Vietnamese and 142 Americans dying by U.S. count before the city was retaken. Fought in the rain and chill of the monsoon against the backdrop of medieval-like gates and palaces, the battle for Hue riveted American attention as perhaps no other during the 1968 Communist Tet Offensive, which has come to be seen as the beginning of the end of the war.

Hue sits in the narrow midsection of Vietnam, which sprawls south to north like an outstretched dragon.

In elaborate inner chamber of Khai Dinh's tomb, a seated statue of the emperor rests atop his remains.

It was as if Hue had to pay for its earlier reprieve from suffering: according to thorough Western documentation, 2,800 of its citizens—teachers, Catholic clergy, civil servants, local officials—were systematically rounded up by the temporary "liberators" and executed in the war's largest political massacre. Mass graves were uncovered after the offensive withered.

Hue—the fortified city itself and the imperial tombs that lie just south of it—is a magnificent artwork, an ensemble of more than 100 major monuments harmonizing with a screen of mountains, lush countryside and the bisecting River of Perfumes. On the river's south bank lies the French colonial city, with its tree-lined promenades and villas in fading stucco. On the opposite shore rises the walled and moated Citadel, enclosing within its two square miles two other cloistered worlds-within-worlds of palaces, gardens and temples: the Imperial City and, within that, the innermost Forbidden Purple City, the symbolic heart of the kingdom, which was reserved exclusively for the immediate royal family, its servants and concubines.

Grandeur gone to ground and an accompanying melancholy are landmarks of Hue. But so is an in-

Located south of the city, tombs of the emperors are surrounded by magnificent temples and landscaping.

stinct to survive remarkable even in survivalist Vietnam. In 1804, incorporating French principles of fortification developed in the 17th century and a far older Chinese version of the city cosmos, Emperor Gia Long —first ruler of the Nguyen dynasty—began construction of the Citadel. For two decades the finest craftsmen, along with as many as 80,000 conscript laborers, were daily mobilized. And when Gia Long and his successors died they simply moved residence—at least so they believed—to the southern environs of Hue, to their tomb-cities amidst pine and bamboo groves.

In the First Indochina War, the Communist Vietminh captured the Citadel, and during their January 1947 battle with French forces, virtually every building within the Forbidden City vanished. Vietnamese officials today blame French artillery barrages and air strikes. Other sources maintain that the besieged Communists set fire to the inner city, feeding some of Hue's finest masterworks to an inferno.

The author, a writer based in Southeast Asia, covered the wars in Vietnam, Cambodia and Laos as a newsman from 1973 to 1975.

During the Second Indochina (or Vietnam) War, between Communists and the U.S.-propped Saigon government, the corrupt, poor and greedy stripped almost every building in the Imperial City bare of furniture, sculpture, paintings and tapestries. Many of the art objects were sold and exported abroad. But for much of that protracted conflict, Hue was the proverbial island of peace. As some of the war's most savage battles swirled in the rice paddies and jungled ranges around the city, its elite citizenry fled into a Confucian realm of refined learning and art, as their ancestors had done so often in the past.

A walled refuge from worldly problems

"Here the old ways and the old families remained more important than money or military power," wrote foreign correspondent Don Oberdorfer in his book *TET!* "Imperious and formerly imperial Hue remained aloof from the money-grubbing Saigon generals, the power-hungry Hanoi commissars and the rich and ignorant Americans." The city was even declared off-limits to American GIs.

But then came the Tet Offensive. Photographer John Everingham, who recently accompanied me to Hue, was in the city shortly after the battle in 1968. He remembers walking through gaping holes in the Citadel walls, blasted open to allow passage of armor. These have been filled in, the relatively fresh, white plaster contrasting with the weathered brown masonry. In the vast, empty throne hall, grenade bursts are imprinted on the walls and iron sheeting covers a hole in the roof that was bored by an incoming shell. The projectile struck one of the 80 graceful columns, and its raw, splintered innards remain exposed today.

Since that last battle, this structure and every other have been attacked by forces less dramatic but no less potent than men at war. Central Vietnam, where Hue is situated, is a climatically harsh region periodically ravaged by typhoons that one official described as "more destructive than a fleet of American B-52 bombers." A technical survey of the monuments, for example, showed a 10 to 15 percent general deterioration over the previous year in the wake of the tropical storm and floods of November 1983.

The Hue area also experiences the highest rainfall in Vietnam, an average of 109 inches a year. Merciless torrents rupture the enameled tiling of roofs, seep through supporting wooden structures and drip onto walls, floors and interior decor. Termites rapidly eat their way through columns and beams of local ironwood once it has been weakened by humidity and fungus. And fast-sprouting tropical vegetation powers its way through masonry, overruns untended gardens and chokes ornamental ponds. Most prosaically, unremit-

J.-L. Charmet

A gallery of Nguyen emperors: at left, Gia Long, founder of the dynasty in 1802, tried to keep the country isolated from Europe. Death of fourth emperor, Tu Duc (right), was followed by French takeover of Vietnam.

ting human pressure takes its toll, because the Citadel is not a museum. It is very much alive, with some 60,000 residents within its walls who must coexist with —to them—cumbersome relics from the past.

Conservation rules appear to be laxly enforced. Cassava plants are grown in palace courtyards and onion patches thrive atop the wide ramparts. The Royal Canal, which cuts through the Citadel, is sown with watercress, lotus plants and fish traps. As Everingham and I walk inside the Citadel, curious children who are trailing us clamber atop a garden pavilion and the lovely, loosened tiles come sliding down.

It isn't that the Vietnamese don't care. Even as war raged, the South Vietnamese government took steps to try to protect Hue, clearing heavy growths of vegetation and repairing the most important buildings, such as the Noon Gate (p. 52) when possible. In 1971, it asked UNESCO to look over the damage, recommend action and then help with the work. UNESCO responded by sending a team headed by U.S. National Park Service historic architect W. Brown Morton III.

"My first trip to Hue to assess the damage was in 1971," says Morton today. "All the royal tombs were in a no-man's-land. You'd get in a copter—it was a short hop from Hue, only five or ten miles south—and you'd have to sort of fly around the mountaintops because the Vietcong would be firing at you. And you didn't know from one day to the next whether you'd be able to land because control of the area went back and forth so much."

The reports of Morton's team became a blueprint for restoration efforts. Then, with the 1975 Communist victory and the reunification of North and South Vietnam, the new government organized a Preservation and Restoration Service to carry on the work that the South Vietnamese had started. In a pilot effort, Humanity Gate (p. 53) on the eastern wall of the Imperial City, which had taken extremely heavy mortar fire in 1968, was restored, including reproduction of its elaborate blue ceramic inlays.

Today, says Hue's Preservation Service vice director, Nguyen van Nghi, 50 people are active in the restoration project, including 15 architects, engineers and technicians. More than 20 others from the overseeing Ministry of Culture make periodic visits. But, says Nghi, the help from UNESCO has been disappointing. In 1981, it selected 15 monuments in the Imperial City and two royal tombs for a $4 million restoration project. Initially, because of limited funds and expertise in Vietnam, great hope was placed in the UNESCO project. A shipment of some 54,000 square feet of iron sheeting to temporarily roof 15 structures was enthusiastically received because, as Nghi says: "In Vietnam the first problem is fighting against water. If you have a good roof, no problem." UNESCO has also provided publicity and advice—but not much more.

French architect Pierre Pichard, who is now the key UNESCO consultant, says it is difficult to raise funds for Hue. UNESCO has nearly 30 similar campaigns, eight of them in Asia, competing for donors. Hue,

Pichard says, does not have the magic ring of a site like Carthage or the Acropolis, and its restoration has not fired the imaginations of experts, since it involves painstaking, relatively miniaturistic work rather than feats of archaeological engineering such as diverting rivers or reconstructing pyramids.

Politics and war, too, have cast their shadows over the city once again. In 1978 Vietnamese forces invaded Cambodia—which once owed allegiance to the Nguyens of Hue—and a large segment of the world community has since shunned Vietnam for its continuing presence in that country. The United States, often a major contributor to international cultural projects, has no diplomatic, trade or aid relations with Hanoi. "I'm not going to try to hide it from you, but we feel the international community is not participating because of Cambodia," says Cu Huy Can, Vietnam's Minister of Cultural Communication, in an interview. "They've helped Borobudur and the pyramids, why not Hue? Cambodia is one problem, Hue is another."

However, neither Vietnam nor UNESCO seems to have given up hope. Piecemeal aid continues and the politics of restoration could change. Indian experts are slated to train Vietnamese workers in wood preservation, the French government will aid next year in battling termites, Polish preservationists are helping.

In a move rare for the meeting-prone United Nations, UNESCO last year recommended postponement of the third Hue working group session in Hanoi because there was little new to talk about. The $10,000 saved on travel expenses for officials was instead channeled into a pickup truck and drafting equipment for the project. "For the time being we have to rely mostly on our own resources. We carry out what you might call midlevel restoration and holding actions," explains Nghi, standing with Everingham and me inside a dank colonial villa that houses the Preservation Service headquarters. Then, donning his black beret, he leads us on a tour of the work-in-progress.

At the edge of the forbidden precinct, barefoot carpenters in threadbare shirts and trousers are planing beams and carving column capitals with rudimentary tools in their makeshift workshop, a onetime meeting hall of mandarins. Superstructure and interiors to be renovated or reproduced are being copied from surviving models and from the meager documentation available in the archives of Hue and France. Pichard obtained some records of the old city from French sources, including a few pre-1947 aerial photographs of the Citadel taken by the French air force.

Although the Vietnamese have been forced to drastically scale down the original UNESCO plan, Nghi speaks ambitiously of totally duplicating palaces, pavilions and walkways as he motions toward the grass and the barest of foundations in the Forbidden City. He proudly shows off Trieu Mieu temple, opening a

By the time emperor Khai Dinh (right) ruled, the real power was in hands of the French governor (left).

Last Nguyen emperor, Bao Dai, here touring a U.S. destroyer, moved to Paris, where he lives in seclusion.

The clouded future of Hue

bay of folding shutter doors, which form the facade, to brighten the interior with sunlight. Built by Gia Long in 1804 as a shrine to venerate an ancestor, it is typical of many Hue buildings that are near copies of Chinese styles but with enough unique poetic flourishes, adaptations to weather and an intimate interplay with the surrounding environment to merit being labeled "Vietnamese architecture." Damage to the rectangular, one-story structure was estimated at 50 percent before restoration began. A section of the roof had caved in, tiles had cascaded to the ground and the elaborately carved open roof trusses were rotting.

In recent efforts praised by Pichard and other UNESCO experts, columns and beams beyond restoration have been totally replicated, while other woodwork only partially damaged has been dismantled and put together jigsaw-puzzle fashion with new sections joined to originals with an organic natural glue. The demolished yellow and green enameled tiles—so characteristic of imperial Hue—were replaced by original roof cover from other sites.

An estimated 20 million tiles, along with roof decorations of dragons, phoenixes and heavenly bodies, will be needed at Hue, but production attempts have thus far proved unsuccessful. Nghi dismisses reports of secret formulas now lost; fine traditional tiles continue to be made elsewhere in Vietnam, but the postwar transportation network is a shambles. Attempts at producing tiles and decorative bricks at Hue have been plagued by poor temperature control during the baking process and the necessary remedy—a pyrometer—remains on the UNESCO "wanted" list.

Far simpler yet perhaps even more vital tasks—like the clearing of destructive vegetation—has been lackadaisical despite the vaunted ability of Vietnam's Communists to "mobilize the masses," which are certainly large and barely employed in Hue. We search for an hour and fail to find the tumulus of Emperor Minh Mang because the walled, circular burial ground has become a veritable jungle. We spend an afternoon of volunteer labor uprooting young fig trees veining their way through the wall of an amphitheater where trained tigers and elephants fought to the death for the amusement of the royal court. At the other end of the labor spectrum, Pichard notes a reluctance by sorely needed Vietnamese supervisors and technical experts to come down from Hanoi, a not uncommon phenomenon in developing Asia—Communist or capitalist—where the relative comforts of capitals are not readily forsaken for the rigors of the provinces.

Despite such shortcomings, Pichard and UNESCO officials like former Asian cultural advisor T. N. Upraity express admiration for an overall effort under difficult conditions, an effort propelled by strong nationalist sentiment and justified by a Marxist dialectic which propounds that Hue's marvels may have been ordered by feudal despots but they were realized through the blood, sweat and skill of the common man. This analysis is accurate, in part. The emperor was despotic—a chief administrator, judge and priest who believed his mandate came directly from heaven. No subject dared look at him, and his vengeance could be terrifying. Yet sometimes the emperor's end was the most horrifying of all. When the first emperor of the Nguyen dynasty, Gia Long, deposed his predecessor, that unfortunate man was bound hand and foot to four elephants, which were then driven in four different directions. It was an age when enemies were slowly stripped of their skin with pincers, their limbs hacked off and bones broken.

An admonition to rule with wisdom

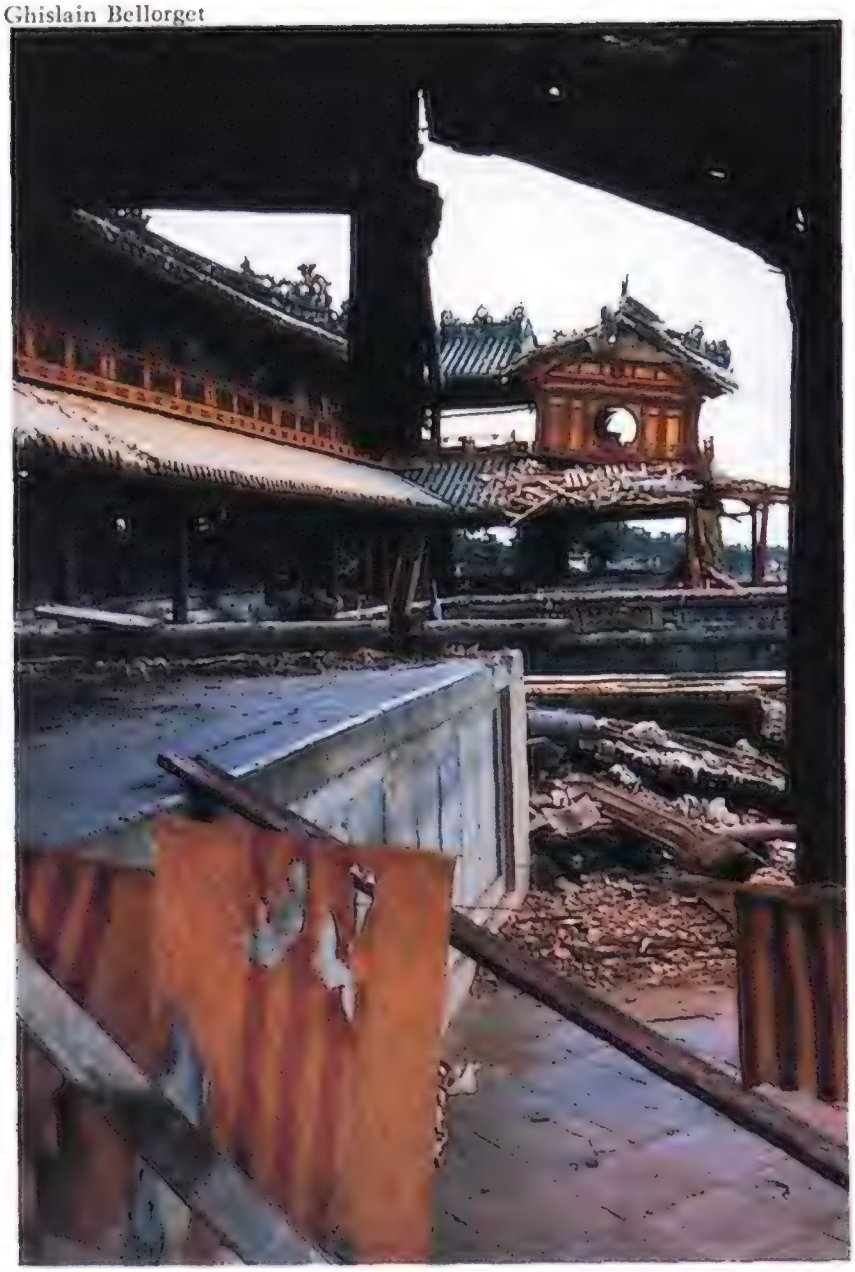
But the emperor's powers were tempered by Confucian admonitions to be the father figure to his subjects and to rule with wisdom, lest he risk losing heaven's mandate. Nor was there a self-perpetuating nobility; the governing class consisted of mandarins recruited through examinations—a system that had been in place since the 11th century. Rural society, too, enjoyed considerable autonomy, as reflected in the oft-quoted Vietnamese saying: "The emperor's authority stops at the village gate." European colonials then, and Marxists now, have tended to ignore these aspects of imperial rule, respectively portraying the emperors as Christian-butchering pagans and ruthless exploiters. The emperor Minh Mang did move against Christianity, barring missionaries,who he feared might "enter furtively, mix with the people and spread darkness in the kingdom." But the technologically superior Europeans kept coming.

Despite impressive reforms begun by Gia Long and

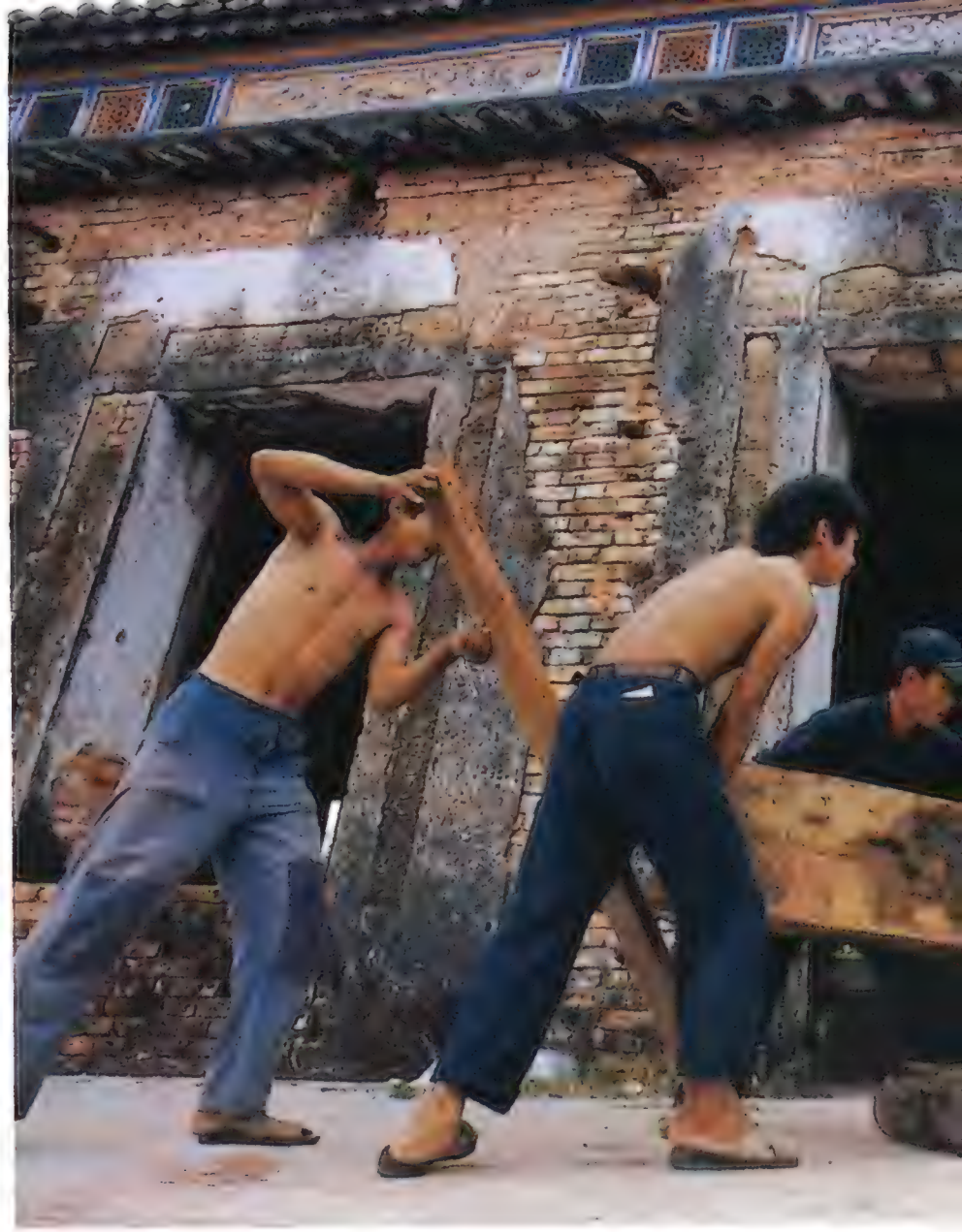
Wearing graceful *ao dai*, three Hue women stroll through the plant-invaded gate of Minh Mang's tomb.

Pavilion of Light at tomb of Minh Mang looks serene, but 1983 flood undermined temples' foundations.

Ghislain Bellorget



East wing of Noon Gate almost collapsed during Tet Offensive; the South Vietnamese quickly shored it up.



Inside the Forbidden City, workers move a beam across porch of the severely damaged East Pavilion.

continued by Minh Mang, imperial Vietnam remained a static world directed by men well versed in classical Chinese literature but poorly equipped to mobilize economies and armies. Vast energies were also sapped by the tomb-building efforts.

Tu Duc, who killed his elder brother, reached the throne in 1847. He harnessed some 3,000 workers to erect his 30-acre, 50-monument city of last repose. Many died during the three years of labor and a revolt of the workers was harshly suppressed. "Ten thousand years, ten thousand years. A tomb built for eternity," lamented a popular poem of that time. "The bones of soldiers garnish the ramparts. The blood of the people fills moats and ponds." Among the whispering pine groves of his necropolis, Tu Duc sought respite from Hue, vortex of a kingdom spiraling downward.

As Tu Duc lay dying, he imagined revenge-seeking victims of his reign ripping open the throbbing tumor in his back. "He pleaded before the phantom of a murdered brother he believed was standing before him," wrote a French chronicler. But personal guilt was not his sole agony: if ever the Four Horsemen of the Apocalypse had visited a kingdom, it had been his. There had been famine and the plague, typhoons and drought, pirates and rebels. French colonials were marshaling at his gates and no heirs had been born from his more than 100 wives.

The only source of peace for Tu Duc on his deathbed was the funerary monument he had built for himself at Hue. His vast necropolis included lakes, gardens, pavilions, even a theater. Mandarins and generals of stone stood ready to guard his remains for eternity—or at least, as he envisioned, for 10,000 years. Today, just a little more than a century since Tu Duc's death, rotting columns threaten to collapse beneath the pavilion where this haunted despot wrote some of his 4,000 poems and appraised sensuous dancers by moonlight. A stela inscribed with the story of his reign is scarred by graffiti. The acrid stench of bats hangs in the air.

Two years after Tu Duc's death, using the persecution of Christians as a pretext, the French found it easy to carve into Vietnam. They took Hue in a bloody attack in 1885. Tu Duc's successors continued to mount the throne, maintaining lavish life-styles and the trappings of royalty, but the power was not theirs. They were a tragic and pathetic line of infants, incompetents and rebels. One was deposed after one day; another was poisoned after four months. Three—including a

Its twin, the West Pavilion, remains intact, but most of the buildings there were lost in 1947 blaze.

In 1977, Vietnamese preservation agency restored Humanity Gate, blasted by mortar, shrapnel in 1968.

father and son—were exiled for resisting the French and their governor general, the "shadow king." Khai Dinh, next-to-last of the 13 Nguyen rulers, aptly symbolized Vietnamese impotence. Sickly, childlike, possibly imbecilic, he loved to dress up in imperial robes, a sword by his side—and light bulbs prankishly attached to his chest, which he would light up via wires running from batteries secreted in his pockets.

Yet the charade was played out. "May his happiness be as immense as the sea. May he be blessed with ten thousand happinesses and ten thousand longevities," chorused his subjects, presenting him with jade, silks, rosewood cabinets and niello vases during an auspicious royal anniversary in 1924. A French resident of Hue described this sumptuous celebration—three days of banquets, games and ballets:

"The central gate of the Imperial City was opened at last. Troops with yellow leggings and white jackets presented arms at the call of the bugle. Royal musicians broke into a march and two white horses, caparisoned in red, advanced slowly, each followed by a bearer with yellow umbrellas."

Child dancers carrying paper lanterns wove silently through courtyards, their red caps surmounted by golden lotuses scintillating like stars. An orchestra appeared and vanished again as if dispersed by a magic wand. Accompanied by flutes, gongs and song, the children formed luminous mosaics that told stories of wars, ancient glories and Khai Dinh's ancestors.

Khai Dinh's son Bao Dai, who was crowned emperor in 1926 at the age of 12, spent nine years acquiring an education in France, along with a taste for tennis, poker and women. Despite tutelage by colonial masters from the cradle, the young monarch proved embarrassingly shrewd and independent. But French power was too deeply rooted; Bao Dai's qualities were contained. "Everything in fact which involved the daily life, the future of my country and my people was forbidden to me. I was nothing but an extra in a play," he wrote in his 1980 autobiography, *Le Dragon d'Annam*. The drumbeat of revolution, too, was sounding from the wings.

The chaotic aftermath of World War II allowed Communist guerrillas, who had fought hard against the Japanese, to march into Hanoi from mountain bases. In short order, their leader, Ho Chi Minh, dispatched three emissaries to Hue, including the only member of that delegation who is still living, culture minister Cu Huy Can.

On August 25, 1945, at the Noon Gate (p. 45)—once reserved solely for the emperor's use—Bao Dai abdicated in favor of Ho Chi Minh's new order. The old yellow flag of imperial Vietnam was allowed to be flown for one last time over the ramparts. And the trio of Hanoi negotiators became the first and last subjects to shake hands with an emperor. (Bao Dai would later return for several years as sovereign of a nominally independent Vietnam, but his time as emperor was over.)

Communist documents talk about tens of thousands at the abdication ceremony; Bao Dai recalls only several thousand people. Dressed in a brocaded tunic and yellow turban, speaking in an emotion-choked voice, the last Nguyen emperor addressed the gathered: "As

Imposing ceramic dragon, symbol of nobility and power, surmounts roof of Palace of Supreme Harmony.

for us, we have known great bitterness during the 20 years of our rule. Henceforth, we are happy to assume the status of a free citizen in an independent country." The Hanoi emissaries were presented with two symbols of royal authority: a gold seal and a sword with a ruby-encrusted handle. Can remembers unsheathing the sword, finding blotches of rust on its blade and lifting it skyward to thunderous cheers. Bao Dai's recollections are quite different. In his memoirs, he writes of encountering an old woman who tells him: "Your departure is a catastrophe. We will lose everything. It is as if the heavens have fallen on our heads."

Negotiations prior to the abdication had been without rancor, and the commissars promised to protect and care for the imperial monuments. "We told him this was not a problem because Hue was the people's patrimony," says Can. "You know, history moves strangely. I saw Bao Dai abdicate and now I am keeping the promise I made him."

To say Hue is undergoing a renaissance under the Communists would be misleading. War has finally ended, but other Horsemen—ideology, economic woes and postwar disillusionment—ride over a city that had once led Vietnam in literature, music, medicine and astronomy as well as life's refinements. Its citizens were reputedly endowed with exquisitely simple manners, its women with great beauty and its cooks with a touch that created some 1,700 of the 3,000 dishes that make up Vietnamese cuisine. Today, just making ends meet is a full-time preoccupation for most of Hue's 200,000 people. But poets still abound, as do orchid hobbyists and breathtakingly beautiful young women who will purchase flowing, white *ao dai* and matching white gloves despite minuscule incomes. The patina of Hue still endures today, especially when one passes over the River of Perfumes to the north bank, entering a world ready-made for 19th-century romantic poets rather than for 20th-century revolutionaries.

We enter the Citadel through the southern and principal entrance to the Imperial City, the Noon Gate, where people cheered Khai Dinh and wept for his son. It is late afternoon. Schoolchildren play football, lovers stroll and vendors offer sugarcane, coconuts and pomelos around the triple-arched entryway.

We walk up the grand Reception Plaza, around the Palace of Supreme Harmony and beyond to a crumbling wall. The grass is high and wild; above it protrude a traditional bronze urn and a pair of street lanterns transplanted from fin-de-siècle Paris, solitary, surreal peripherals to what the great 1947 fire swept away. A few bicyclists are pedaling home through the Forbidden City, trailed by the distant music of an amplified flute. Only with a guide map can one locate Kien Trung, the palace built by Khai Dinh and modernized by Bao Dai, its last royal resident. A short stairway, flanked by two brass cannon, leads to nothing but a few floor tiles, empty pedestals, patches of cassava.

Nearby, in a compound once reserved for the Queen Mother, a cow browses inside a now one-walled tea pavilion. A rusty gong, suspended by a makeshift wire, hangs at the entrance of the private pagoda, ringed by a dry pool. Inside the palace proper, amid charred columns and evening shadows, lies an empty wooden coffin, and next to it on the dust-caked floor its immovable lid. "Was it meant for the mother of Bao Dai?" we ask some workers, but nobody knows.

Her Majesty Doan Huy vacated this palace the day after the dynasty fell. Bao Dai, Empress Nam-Phuong and their five children eventually left for exile in France, where the ex-Emperor still lives. But Doan Huy remained in Hue, moving to a two-story stucco house down by one of the many canals that crisscross the city. When she died in 1980, at the age of 91, she was the last of the Nguyens in Hue. Communist authorities gave her a rather reverent funeral; the pillow on which she last rested remains carefully in place along with a pair of silken slippers beneath her bed.

The tiny, wizened woman was a fine reflection of Hue's indomitable spirit. In 1974 she told an interviewer that she had refused to abandon the city through three decades of wars and agony because it was her duty to attend to the tombs of her ancestors. "I am very sad, exceedingly sad. When I was young, Hue was so beautiful," she said quietly. "Then it was ruined." But she had heard of plans for reconstruction and hoped Hue would once again be beautiful.

Stone mandarins and animals guard tomb of Nguyen emperor Dong Khanh—built to last 10,000 years.

NUNC est bibendum!!

c'est-à-dire:

PNEU Y.

PNEU X.

MASTIC MICHELIN

“À VOTRE SANTÉ

LE PNEU Michelin

BOIT L'OBSTACLE !”

By Rudolph Chelminski

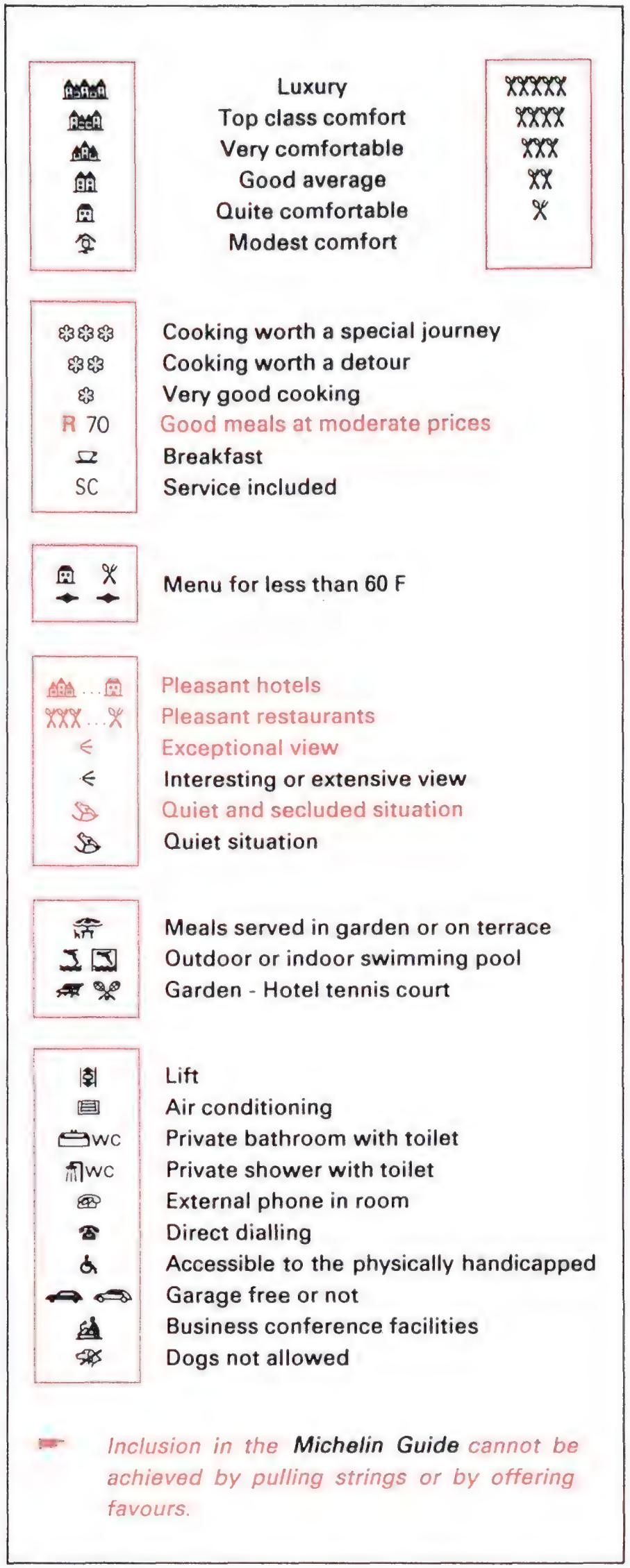
Chez Michelin it's tubby tires and a cachet of symbols

Superior maps, travel guides and epicurean éclat maintain a French family dynasty as the pacesetters for international tourism

"Well, you've got to know your Michelin," Quentin insisted as he flipped through the pages of the fat red book. "That's why we went to Rilly. Look here, now: one little house means quite comfortable; the red quotation marks around *parc* mean it's got a big, pleasant garden; it has the cheap menu sign, which means the food is good and inexpensive; *and* it's a chateau. What more do you want? It's a terrific deal. All you have to do is know how to read the symbols."

Quentin Hope is a scholar (professor and former head of the French department at Indiana University), author, athlete, gourmet and world traveler with particular expertise on matters French. As much as all of these, though, he is a seasoned, big-league, inveterate Michelin addict, a man who would no more think of voyaging around Europe without one or several of the plethora of guides and maps put out by this curious and rather inscrutable French tire company than he would consent to promenade up the Champs-Elysées without shoes. His magisterial explanation of why he, his wife and the lucky grandson who was traveling with them chose to sojourn at the Château de la Haute Borde in Rilly-sur-Loire, 125 miles from Paris and 23 from Tours, nicely summed up both the peerless quality and the sometimes bedeviling arcana of symbols

Familiar "Michelin Man" Bibendum first appeared in 1898 poster, preparing to down tire-killer drink.



Bookmark from 1986 Red Guide to France translates a sampling of Michelin's comprehensive symbols.

Color photographs by Pierre Boulat

FOR OFFICIAL USE ONLY
1939
GUIDE
du pneu
Michelin
30 fr.
Comment se servir du guide . . . p. 9
How to use this guide . . . . p. 22
Signes conventionnels . . . . p. 20
Carte générale de la France . . p. 1
Carte grandes routes et distances p. 2
Cartes et Guides Michelin . . . p. 48
Les bonnes tables . . . . . p. 29
Les bons vins . . . . . p. 28
Les hôtels isolés . . . . . p. 36
Voir la suite au dos du guide.
Reproduced by
MILITARY INTELLIGENCE DIVISION
WAR DEPARTMENT WASHINGTON, D. C.
In World War II, U.S. War Department gave facsimile editions of 1939 Red Guide to field commanders.

that characterize Michelin's most famous products besides tires: the redoubtable, often-cursed but still indispensable Red Guides to hotels and restaurants, Green Guides to touring, and the red, yellow and blue maps of terrain spanning Lisbon to Vienna.

Had he wished to go on to the graduate level of Michelin reading, he could have shown me symbols of the sort that become the stuff for doctoral theses, far more cryptic than the kindergarten variety reproduced on page 57. He could also have read off, with disconcerting ease, the *département* of the town, its zip code, its altitude, population and location on which fold of which Michelin road map. With Michelin, you get the whole story, like it or not.

Even though travel guidebooks have been around for centuries (you could make a plausible argument for Herodotus as the inventor of the genre), and names like Baedeker, Fielding and Gault/Millau have had their moments of glory, none of them can quite measure up—in accuracy, professionalism, clarity of presentation and sheer bulk of material—to the world standard that the Service de Tourisme du Pneu Michelin has developed over the years since the fateful Easter of 1900 when André Michelin, the company's founder, printed the first *Guide Michelin* with a seemingly vainglorious prediction: "This work appears with the century; it will last as long." Surely he was too modest.

Perhaps it has something to do with the cold precision of the Cartesian logic that continues to mark, still today, this nation's educational system, and surely the fact that it has been a center of travel since before Caesar is relevant, too. But it is clear to anyone who has spent any length of time in Europe that no one makes maps and guides like the French, and no one in France does it as well as Michelin. As well or as thoroughly: the enterprise that began with the 1900 *Guide Michelin* to French hotels and restaurants has turned into a steamroller of tourism: 196 different publications (118 maps, 78 guides) covering travel, sightseeing, lodging and eating throughout Western Europe, with forays into Great Britain and Ireland, Africa, New York City and, most recently, New England and Canada. Just as surely as the Rhône flows into the Mediterranean, this stream of maps and guides will be increasing over the next few years, too—but Michelin will never say what will be coming out, or when, although rumor has it that a Red Guide to New York City is in the works. That's the way it has always been with this singular company and the singular family that runs it: Michelin does things its own way, no other way, and you just damn well had better get used to it.

To say that Michelin has a penchant for secrecy is about like announcing that Germans have a penchant for beer drinking. The corporate eccentricities of this huge firm—110,000 employees in Europe, Africa, North and South America (e.g., 3,000 in Greenville, South Carolina) and second world producer of tires, right after Goodyear—are a standing joke in France, a cause of exasperation tinged with grudging admiration for the cheekiness that is so perseveringly pursued and so artfully achieved.

Keepers of secrets: les deux François

Michelin is personally directed by a family inner circle under François Michelin and his cousin François Rollier, who both wear the only executive title that the company allows—*gérant*, or manager. Proud of its innovative technology—the Michelin company developed their demountable automobile tire before the turn of the century and, more recently, the radial tire, which just about everyone else in the business has copied by now—and convinced the world is conniving to get at it, the enterprise is structured like a spy network or an old-line revolutionary cell: individuals may know parts of the secrets, but it is only the handful at the top with *les deux François* who have the panoramic view of the whole. To keep up their defenses against industrial espionage, Michelin maintains a perpetual vigilance against transgressors, both from within and without. Everyone in France has

heard the story of how General de Gaulle was quickly shooed from one harmless point to another during a presidential visit to the factories, and even the Nazis, Michelin people say, saw nothing when they had France at their mercy after the 1940 armistice. The *gérant* of the moment simply told the Wehrmacht that the factories were not to be visited, and that was that. *Ach so.* When the SS insisted, they got the same kind of tour as de Gaulle. "We prefer to say discretion," a company spokesman tells me with that inimitable, unshakable Michelin complacency. "Let us say we have our way of doing things."

The Auvergne, whence the company sprang, is like Vermont: worn old mountains, rocky, ungenerous soil and a harsh climate. These conditions have created a native population that is as close to the New England Yankee as any I know, and this, in turn, explains a lot about the Michelin corporate style. What it does not explain is the surprising flip side of the coin, the public-relations genius that was lying dormant within the bosom of young André Michelin (1853-1931) as he took his early classes in the Auvergnat capital city of Clermont-Ferrand and later his engineering studies in the prestigious Ecole Centrale in Paris, then burst into bloom when he returned to Clermont to take over the rather insignificant family business devoted to the manufacture of rubber balls and miscellaneous agricultural gear. Just as much as the technical skills, it was a faculty for currying consumer loyalty that established Michelin in the first place and then held it steadily on the path of prosperity.

Although it was an Englishman, Robert William Thomson, who invented the pneumatic tire in 1845 (he called it an "aerial wheel") and another one, John Boyd Dunlop, who applied it to a tricycle in 1888 by gluing a rubber tube onto a solid tire, it remained for André Michelin and his younger brother Edouard (1859-1940) to come up with one solution that helped

Demonstrating first use of pneumatic (air-filled) tires on car, founder André Michelin (left) drives at 12 mph, June 1895. Automakers refused to build one for them, so Michelin brothers made own vehicle.

Bibendum tire pump, 1930s, had a unique air tank. Compressed-air hose led from his mouth to tires.

make the newfangled things practical: a tire, with an inner tube, that could be wrestled off and back onto the rim without all the messy, time-consuming business of gluing (hours for the repair and overnight for drying the Dunlop model). Their first patent for a dismountable tire, fastened into place by 17 bolts, came in 1891, but the public was reluctant to accept the ridiculous idea of rolling on air even after a bike equipped with Michelin tires beat 209 other competitors in the Paris-Brest-Paris race that very year. Determined to get his point across, André organized a Paris-Clermont race in 1892, and dispatched a car ahead of the bikes (all with his air-filled tires) to seed the route with upholstery tacks, a strategem that rewarded him with 244 flats. As he had anticipated, newspapers reported at length on the ease and rapidity of the repairs which the riders carried out themselves; a year later 10,000 Frenchmen were riding on Michelin tires.

By 1894 Michelin was manufacturing tires for carriages and, almost immediately after, for automobiles —there were two or three hundred of them in France by then and they struck André as a promising development. Year after year, he entered cars in various races, winning a few and losing a few, but mostly beating the drum for the excellence of the Pneumatiques Michelin with which they were equipped. Engaging two dozen of the best known *affichistes* (poster artists) of the moment, André turned out a glorious series of posters that inevitably appealed to the male of the species—the ones who did the buying and the driving in those days. They mixed speed and the thrill of danger ("The Rail Vanquished by Michelin Tyres!" cries the headline of a breathtaking scene where a pre-Barney Oldfield racer in the foreground careens around a corner as a locomotive labors over a trestle behind) with practicality and thrift (Michelin tires "drink" obstacles). With print runs in the thousands, the posters graced garages and shops not only in France but throughout Europe as well, because André had them printed in the major European languages, including Russian.

A bulging stack of tires and—voilà!—Bibendum

It was one of these early drum-beating exercises that gave birth to the idea for the Michelin Man, the tubby figure made of tires who went on to become one of the best-known and most successful corporate symbols of all time. Walking around the Lyons fair in 1894, André and Edouard came upon a stack of tires of different sizes, bulging in the middle and tapering upward. "*Tiens,*" said Edouard, "add arms and you've got a man." Four years later, the *affichiste* O'Galop did exactly that, and the Michelin Man was born and quickly named Bibendum.

Why Bibendum? Because O'Galop's poster (p. 56)

Choose a life insurance plan as unique as your personality.

At The Prudential, we look at your dreams. Your desires. The ideas and values you've attached to your life. And then we help you select a life insurance policy that will be compatible with you.

If you like to keep your options open, you might want a policy offering flexible premiums coupled with high interest.

Take-charge types will prefer selecting both premium and investment flexibility. We have policies that allow for investment decisions in any combination of five accounts: common stock, bond, money market, an aggressively managed account, and one with a conservative approach.*

Then again, there are policies that take the pressure off you. They entrust The Prudential with all investment decisions.

But before you decide, you'll meet with a Prudential/Pruco Securities representative who will carefully explain your options.

And because no two personalities are the same, we'll help pin your life insurance hopes on a policy that's right for you.

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The Prudential

Insurance & Financial Services

depicted a weird fantasy of a pneumatic banquet, with the Michelin Man, hale and unmarked, a cigar in one hand and a huge goblet in the other, standing to offer a toast. In the goblet was a selection of the finest tire poisons imaginable—a cocktail of nails, broken glass, sharp bits of metal—and the Michelin Man was saying, "*Nunc est bibendum!!*" Latin for "Let's drink!" in the macho sense of "Look what *I* can drink!" Beside Bibendum cower the blanched, terrified faces of Tire X and Tire Y, demoralized, scuffed up, already three-quarters flat, while a caption announced that Michelin tires drank road hazards. It was perfect, an inspired image—funny enough to be sympathetic but clear enough to make the point—that appealed to the public and stuck in the memory. O'Galop had created the corporate equivalent of Snoopy or Mickey Mouse.

Bibendum has changed since, ditching the cigar when it no longer represented success and power, his lines becoming simpler and more caricatural, and the multitudinous layers of skinny old tires giving way to the 20 or so fatter ones of more modern appearance. But he still inspires the magical consumer loyalty so dear to André. European truckers in particular identify fiercely with Bibendum—with him, they share ample tummies, the badge of their sedentary work, but feel pride of kinship with his fearless character—and his plastic effigy bolted to the roof of a semi's cab is as much a sign of the brotherhood of the road in France as are the glistening silver air horns of their American

Behind barricade of all the Red Guides, veteran guide chief André Trichot holds first one, issued in 1900.

Jean-Manuel Cana, map *documentateur*, tapes update. For accuracy he'll use camera and hill-incline gauge.

cousins. The more demonstrative drivers, especially the Italians and Spaniards, sport them in pairs and light them at night. It is terrific free advertising and it must drive Goodyear, Pirelli, Dunlop and all the other competitors mad with envy. To make matters more intolerable, Michelin doesn't even give the Bibendums away: the truckers buy their fetishes.

Having proved that rolling on air was feasible, after all, André turned his energies to ensuring that as many people as possible did it: from the turn of the century on, he promoted not so much the tire (that would take care of itself) as the entire concept of motoring. By making driving ever easier, more attractive and rewarding, he would be able to encourage the industry to build more cars and, ipso facto, order more tires. Thus was born the famous Red Guide (left) and then, later, the Michelin maps and the Green Guides.

When at Easter 1900 André sprang his big surprise, the first Red Guide, on the public, motoring had already developed to a very considerable degree over the six years in which he had been manufacturing car tires. Purely a promotional stunt, the guide was clearly marked "not for sale," was filled with ads and was offered gratis to chauffeurs. The first two print runs give an idea of the way the car industry had burgeoned since 1894: 35,000 in 1900 and 50,000 in 1901.

The initial Red Guide was quite revolutionary and entirely in the Michelin style: 939 pages on Bible paper, pocket-size, listing from A to Z the French towns whose resources in hotels and garages would be of interest to the motorist. It opened with a 58-page lecture that could be entitled "Motoring 101," didactically covering every subject from pretty roads versus boring ones, to the correspondence of inner tubes and valves for different sizes of hubs, to how to pump up a tire, fix a flat or check a leaky valve. Most of the gasoline depots he listed were not garages but general

Arthritis?

Don't suffer more than you have to.

Arthritis, our #1 crippling disease, strikes one in every seven Americans. While it rarely poses a threat to life, the condition can make everyday living a frustrating, painful experience. But arthritis is not a disease without hope. Sufferers *can* be helped. Unfortunately, many people fail to seek proper medical treatment.

What arthritis is and how it can be helped.
Simply put, *arthritis* means inflammation of the joint. Swelling, redness, and especially *pain* are present in nearly all cases. Typical symptoms you might experience are early morning stiffness or aches, difficulty in movement or bending, or swelling and/or tenderness in one or more joints (i.e., hands, wrists, feet, elbows, knees, or shoulders). Over 100 forms of arthritis are known today. They appear in all age groups, from children to the elderly. The two most common forms are:
Osteoarthritis—The most common type, usually associated with advanced age.
Rheumatoid arthritis—Often beginning between 40 and 50 years of age, this can be the most debilitating type of arthritis.

Both forms are more prevalent in women than in men. Their causes, as well as cures, are at present unknown. But experience has shown that arthritis sufferers can benefit greatly from proper treatment. A range of advanced therapies, including new medicines, have been used to reduce the pain and inconvenience. Today there are drugs which not only are very effective, but can also reduce the number of doses previously needed to as few as one per day. Along with medicines, a tailored program of exercise and rest can be used to strengthen joints and keep them moving more smoothly. Your doctor can also instruct you on ways to help yourself at home (hot baths, massage).

**Beware of myths and quackery—
they can hurt more than help.**
It's not unusual for arthritis victims to seek out mystical or untried "cures," like copper bracelets or exotic herbs. Unfortunately, these and other "miracle" treatments *cannot* cure or even help your arthritis. They often do result in a waste of money and a delay in proper medical care.

Proper treatment starts with your doctor.
The sooner you bring symptoms to your physician's attention, the sooner you can begin to correctly manage your arthritis. And while it is you who must take that first step, it's important to remember that your physician, along with other health professionals, can help make your arthritis easier to live with. They are part of the overall health support system. We call it...

Partners in Healthcare:

You are the most important partner.
Only you can make the decision to see your doctor. It is you who must decide to accept the guidance and counseling of your physician, pharmacist and other healthcare professionals. When medicines are prescribed, only you can take them as directed.

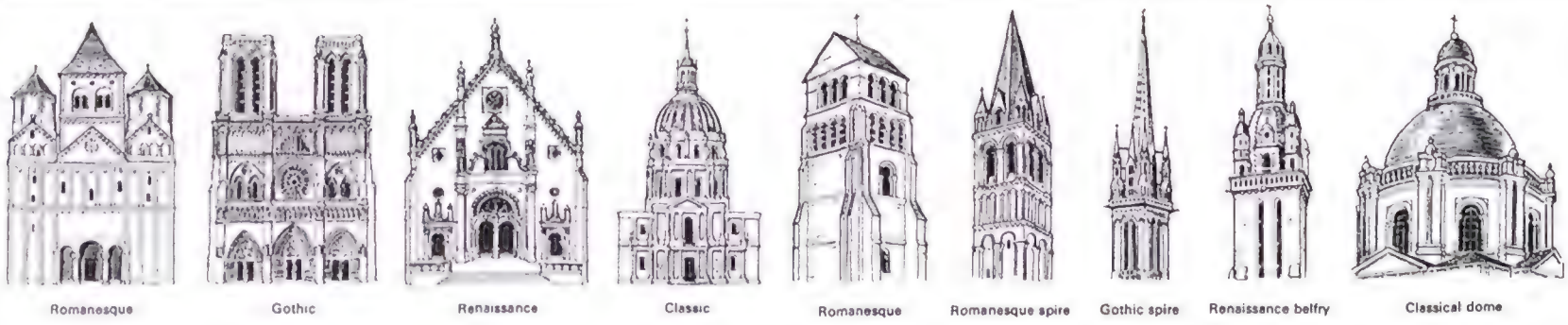
Your doctor interprets the warning signs, orders your tests, and makes the diagnosis.
Along with the proper program of rest and exercise, your physician also prescribes the best medication for you among those available—considering each drug's characteristics—and monitors your progress.

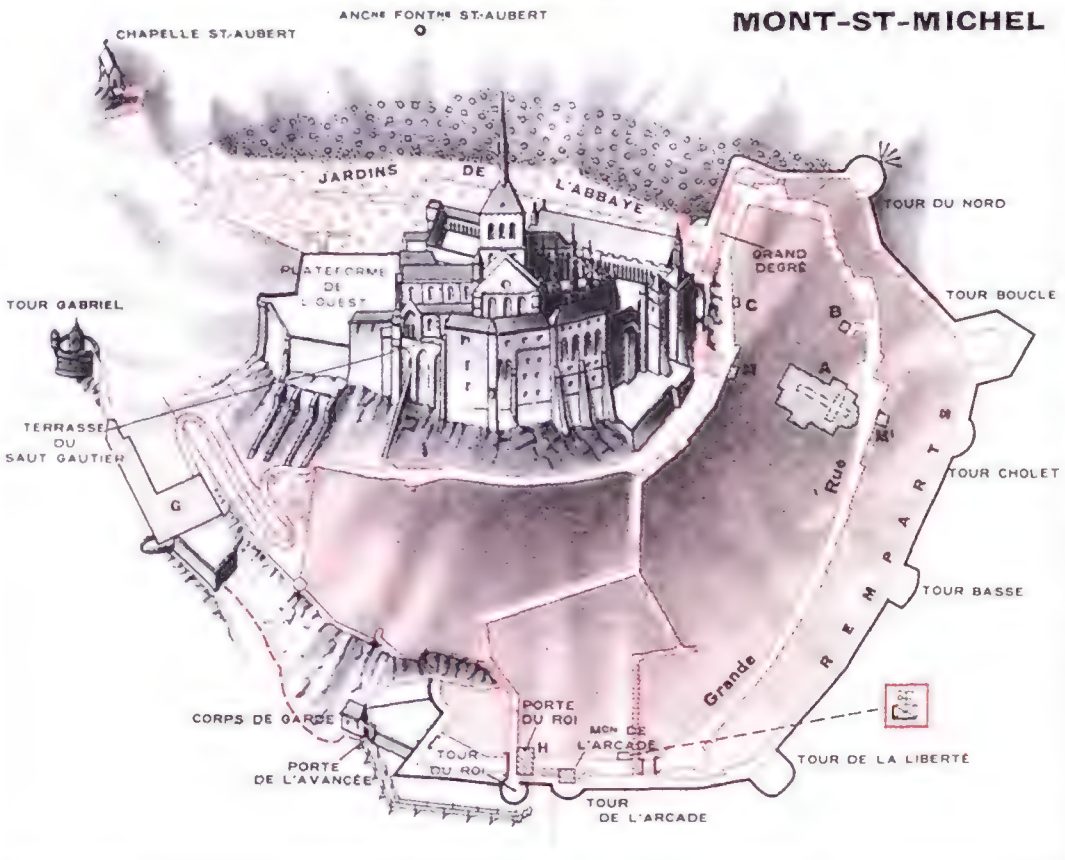
All those who discover, develop, and distribute medicines complete the partnership.
Pfizer's ongoing research brings you essential medicines for a wide range of diseases. Through development of these and many other medications, along with providing important healthcare information, we are fulfilling our responsibility as one of your partners in healthcare.

For additional information on arthritis, please contact your local Arthritis Foundation Chapter.

For reprints of this Healthcare Series, please write: Pfizer Pharmaceuticals, Post Office Box 3852AR2, Grand Central Station, New York, NY 10163

Pfizer PHARMACEUTICALS • A PARTNER IN HEALTHCARE





A sampling of line drawings in the Green Guides: facades, belfries, spires and a dome from Provence; Brittany's Mont-St-Michel complete with topographic perspective; in Spain, Andalusian flamenco dancers.

stores or grocers who sold cans of the stuff, and he did not fail to point out that both saddlers and cobblers were usually skilled at repairing blown tires. Many of today's symbols were already in use, even the world-famous little blossoms (erroneously, in my opinion, known as stars). In those days, though, they referred to hotels only, since Michelin did not yet list restaurants separately. Three symbols now discarded indicated whether or not the hotel itself sold the three different kinds of gas then available, and a black diamond showed that the place had a darkroom for amateur photographers. In 1901 Michelin added the initials "W.C." to its symbol list, indicating that the hotel possessed that ultramodern apparatus, the flush toilet.

"I am always astonished by his vision," says Bernard Naegellen, *résponsable* (person in charge) of today's Red Guides. "Since his first guide, all we've done is to make small improvements on his basic idea."

Quite true. The modern Red Guides are faithful descendants of the first one, resembling their ancestor as much as a son does his father. The symbols—Michelin's trademark, passion and besetting sin—have grown in number and complication with the years, but there is always a logical explanation for their presence and, as spokesmen never fail to point out, it is only through the use of symbols that the amount of information which the guides offer can be stuffed into a workable number of pages and be understood by any traveler whatsoever, no matter what language he speaks. As it is, the 1986 guide to France has 1,279 pages focusing on 4,586 localities (614 of them with city maps), and within them 6,604 hotels and 3,801 restaurants. Coverage of the country is so clear and extensive that in World War II the U.S. Army issued a facsimile of the Red Guide to France (p. 58) to frontline officers for navigating through urban areas. The edition was stamped "For Official Use Only." These days, the 700,000 guides snapped up annually make it a perpetual bestseller, one of the rare institutions in which the French people, so disabused of everything else, place their entire confidence. Far more than any politician, cleric or business leader, it is the *inspecteur de*

For this article, the author, whose book The French At Table *was excerpted in the September 1985 issue, selflessly sampled some three-star cuisine.*

Michelin who personifies rectitude and incorruptibility for the average Frenchman.

The *inspecteur* decides which restaurants, and thus which chefs, get the stars and which don't, a redoubtable responsibility for this most gastronomically inclined of countries. André first began awarding a single star to good restaurants in 1926, and in 1931, the year of his death, he instituted the system which still prevails in all Red Guide countries: one star for "very good cooking," two for "cooking worth a detour" and three, the apotheosis, for "cooking worth a special journey." There are only 20 three-stars in all of France, with La Côte Saint Jacques (p. 66) in Joigny, 90 miles southeast of Paris, the latest addition to the elite list.

A nun joins the monks of gastronomy

The fundamental mission of all three restaurant categories and the guide itself, is to sell tires, of course, but such is the professionalism that characterizes the Michelin operation that there is never the least hint of PR flimflam or collusion of any sort. Michelin's is the standard by which all other restaurant guides are judged, and the others come off no better than second best. The 20 or so *inspecteurs* who make the decisions today are full-time eaters (and hotel checkers), "the monks of gastronomy," a competitor once described them to me. As of 1986 they have been joined by one "nun," the first-ever woman in their ranks. They drive incognito throughout France according to a master plan established at the headquarters of the company's Service du Tourisme in Paris, two weeks on the road for one week back in the office, covering the entire country once every ten years and then beginning again. The importance of their judgments is appalling: quite literally, a restaurant will thrive or fail depending on its Michelin rating, and there has been at least one documented suicide by a French chef after demotion. As of 1957, foreign chefs were offered the opportunity to do likewise when the first Red Guide to Italy appeared, followed a few years later by Germany, Spain, Great Britain and then Benelux, each one staffed by its own native monks who have been recruited by the gastronomic Vatican in Paris.

Less renowned but more profitable than the Red Guides, which break even at an 85-franc price, are the Green Guides to tourism and the stock of 118 maps which Michelin has developed in the years since André introduced the first one—Clermont-Ferrand and its environs—in 1906. By 1913 he had covered France entirely with 47 of the finely-detailed 1/200,000-scale yellow maps. Michelin spokesmen are not afraid to describe this series as the first true road maps in the world and the first to use the accordion fold, which was, they add, André's invention. These points may be open for debate, but *les cartes Michelin* unquestionably were (and are) the clearest and easiest to read, a quality of paramount importance in France, where it is common to see drivers consulting their maps—at the very *least*—as they drive (just the other day I watched a man reading the poems of Prévert as he tooled along the Autoroute du Sud). Michelin's 150-strong cartography department is entirely oriented to road maps, and clarity of presentation is the number-one imperative. "I always have fights with my people to exclude things they want to put in," says Bernard Paternault, head of the department. "But in road maps, more does not mean better."

It is perhaps this policy of judicious exclusion, allied with an instinctive sense for just-right coloring, that makes a Michelin road map a pleasure to read and another one a bore or a chore. Certainly the driving public agrees, because year in and year out the company sells 12 million of them. Sells, not gives away. The former American practice of offering free maps at gas stations was a heresy horrible enough to make Michelin people shake their heads in disbelief—or would have been, if the maps were worth it. "We are always surprised to see how simple and elementary American maps are," states Paternault with polite condescension. "Roads marked by a single line—imagine!"

Michelin's yellow-map series distinguishes among no fewer than 12 categories of road, from superhighway autoroutes to regional roads, roads under construction, bicycle paths and forest trails. Imagine. On the large "main roads" scale, their red maps now cover all of Western Europe except Scandinavia. Why not Eastern Europe as well? Because Eastern Europe won't allow the cartography department's *documentateurs* (p. 62) to come in with their cars and measuring devices and tape recorders, that's why. If Michelin can't do it the Michelin way, they don't do it at all.

Garage owner Leo Moulin carries Bibendums atop wrecker; he inherited loyalty to Michelin from father.

Restaurateur Michel Lorain, son Jean-Michel delight at receiving France's sole three-star award for 1986.

As he did with the maps, André did with his what-to-see touring guides, but even earlier: his first publication of this sort, covering Clermont and its environs, appeared in 1901 (a year after the Red Guide and five before the first map) and sold for one franc. In 1907 he brought out a touring guide to the Alps and the Rhine, in 1908 Switzerland, and before World War I he had added Germany, the British Isles, Ireland and the then French colonies of Algeria and Tunisia. In these first guides there was a certain confusion of styles since they listed hotels and restaurants as well as curiosities of tourism. It was not until publication of the 1939 Green Guide to Brittany that the present separation of roles took place: Green Guides (which in fact were colored red until the eve of World War II) for deciding what you want to see, maps for finding your way there and Red Guides for eating and lodging. And all of them for promoting tires: so single-minded is Michelin's pursuit of this objective that during the German occupation, when rationing eliminated auto touring, the company put out guides for cyclotourism in the Paris region because they made bike tires, too.

The first all-inclusive Green Guide of the present glove-compartment format was the Paris book of 1948 and it was the signal for the start of an avalanche: the Service du Tourisme publishes 69 different titles today in French, English, German, Italian, Spanish and Dutch, covering all of Western Europe like the maps (again, excluding Scandinavia, which must be a small market for tires). Add to these their first transatlantic efforts, the guides to New York City, New England and Canada, in French and English. As with André's first Red Guide, the Greens have a strong didactic streak, and their long introductions are rife not only with the famous symbols but also with instructive comment about history, local customs, geology, architecture and the like (p.64). If you want to know about New England, you have to follow Michelin through tectonics, metamorphic rocks, schists and Greek Revival architecture. The guide is for vacation fun, but it is also part classroom. "If you don't know what an architrave or a tympanum is, you can't understand Chartres," explains a man from the Service du Tourisme. I couldn't have put it better myself.

Although budgets and sales figures are strictly classified information, a Michelin spokesman allowed as how the most popular Green Guide was the Brittany title, selling more than 100,000 a year, and that overall, the Service du Tourisme managed to break even. Slowly and cautiously, as befits the character of these French Yankees, the Greens are being modernized, with fewer line drawings and more color photographs, making sure that Michelin stays abreast of popular tastes but never stepping too far forward.

Quite clearly, considering the size of the market and the company's big investments there, the United States is a prime target for more attention from the Service du Tourisme, and if ever there were an obvious of the obvious, it would be a series of U.S. road maps, broken down by regions. Finding out about the corporate plans, though, is another matter. "The development of our American collection is desirable," admits Paternault in a giddy flight of daring, "but it is not yet clearly defined. Let us say it is on the agenda."

Now, in case that strikes you as too vague, it is the purest essence of *le style Michelin*. If you require more information, let me suggest that you write to François Michelin himself in Clermont and tell him you are not satisfied and want some more precise details. While you're at it, you might as well ask for a guided tour of his R & D department, with a camera in your hand.

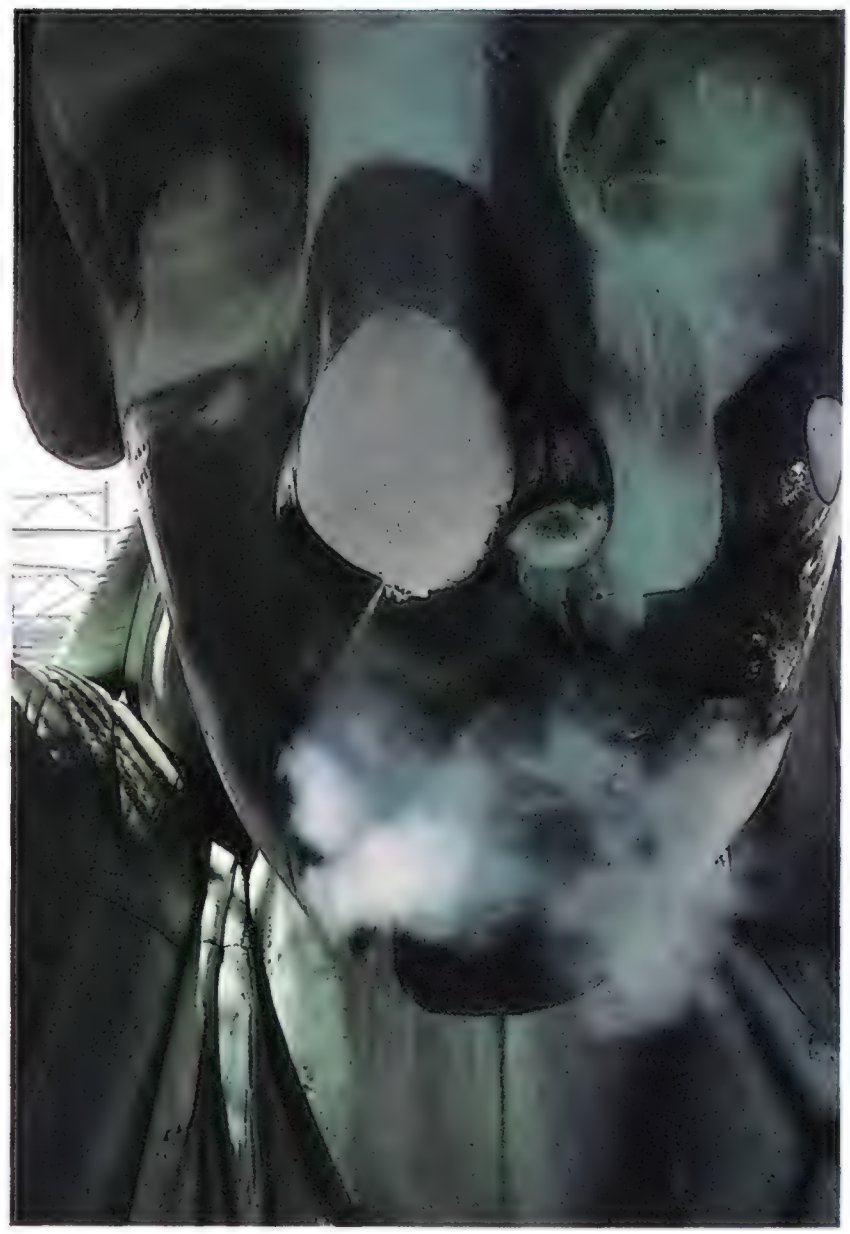
Happy Bibendum touts safety treads and reliability (while twin waits up front) in a 1921 Michelin poster.

MICHELIN
MADE IN FRANCE"

By Spencer Davidson

Liberty primps for that great big birthday party

Sprucing up for the July 4th doings, America's favorite statue gets a costly facial and a lot of useful new insides



Frozen nose and steamy breath come from icy liquid nitrogen sprayed inside the head to remove paint.

The curious cosmetic effects and major surgery that have kept her enshrouded for almost three years were over at last. Weeks ahead of the great Independence Day festival, as the early summer sunrays beamed down on New York Bay, what most struck the eye was the reflection, unbelievably brilliant, from the new gilded torch (pp. 72-73) atop the Statue of Liberty. A hundred years after her debut, refurbished Liberty was lifting a powerful lamp beside the Golden Door.

The world's most celebrated statue looks great, as well she should after $66 million worth of work. Along with the new torch, constructed and carefully gilded by visiting French workmen, Liberty's light green copper patina has been repatched here and there where ravages of time and acid ate through her copper skin—at three thirty-seconds of an inch it is only as thick through as a penny. To get rid of bird droppings she has also been thoroughly scrubbed from her four-foot-long big toes to the seven spikes in her crown. Internally, the framework that keeps her copper shape in shape has been strengthened. Designer Auguste Bartholdi (SMITHSONIAN, July 1984) did not design her for crowds of interior visitors, so both stairs and elevators have been modernized to please the eyes and ease the aching feet of the several million pilgrims from all over the world who now visit the statue each year.

Checking a new seam, workman inspects a metal patch fitted over worn spots near the lady's nostrils.

The pleasure of future pilgrims can hardly match the enthusiasm of teams of engineers, craftsmen and construction workers who have labored over the lady since October 1983, with no sightseers allowed to trouble their work. "It was the job of the century," says Philip Kleiner, a vice president of Lehrer-McGovern Inc., the construction-management firm that supervised the 20 major contractors and scores of subcontractors involved in the project. Kleiner, in fact, was so excited that he put together a slide show of the work as it progressed—and anyone who visits his home these days must sit through it.

For Kleiner and his fellow experts, the technical trials and errors that the unusual renovation required were a challenge. What would sculptor Bartholdi say, though, if he knew that in order to clean it up, 20th-century engineers were bombarding his beloved objet d'art with walnut shells and bicarbonate of soda?

Bartholdi's statue stands 151 feet and one inch tall. She also rests upon a 154-foot pedestal, designed by

All photographs © 1986 Peter B. Kaplan

Hawk's-eye view of Liberty's skull surrounded by ingenious scaffolding was taken from a blimp.

American architect Richard Morris Hunt, of concrete and Connecticut granite. The outside presented few problems. One was how to girdle her 110-feet-in-diameter figure with a work scaffold that would not damage Miss Liberty's delicate skin. The solution turned out to be a specially designed $2 million, 20-story aluminum frame that arrived at the island work site in 6,000 pieces, was "belted" or tied into the pedestal granite-and-concrete base and then secured with cables. But nowhere in its upper reaches was the rigid scaffolding allowed to come closer than 18 inches to the delicate copper of Liberty herself, who can sway up to four inches in a good wind. The scaffold, engineered for 100 mph winds, stood up to 70 mph gusts during Hurricane Gloria last September, and was so unusual that it got into the 1986 *Guinness Book of World Records*—in the "massive scaffolding" category between the world's largest pyramid, Mexico's Quetzalcoatl (175 feet), and the world's tallest scarecrow (20 feet), located at Snipes Farm and Nursery in Morristown, Pennsylvania.

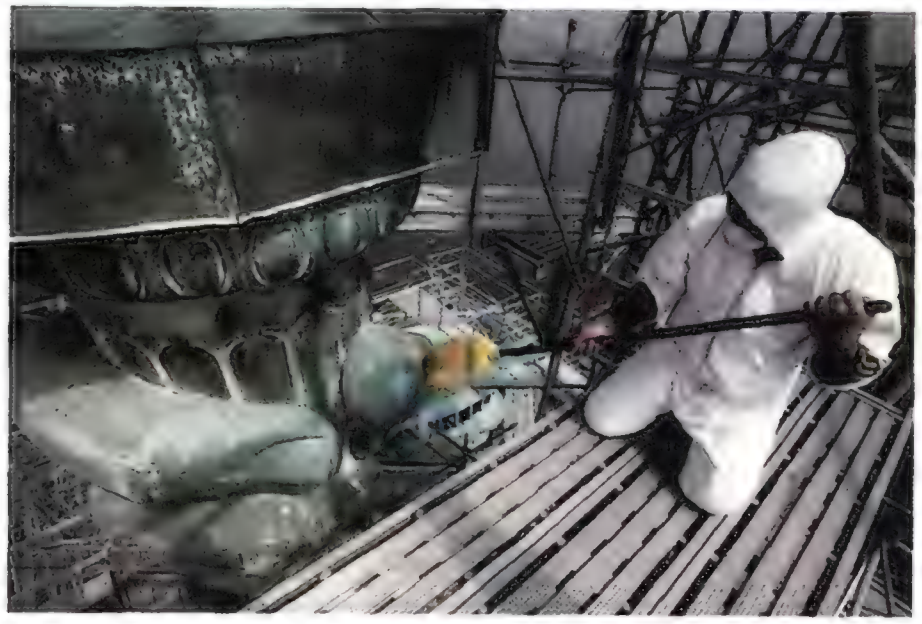
The copper skin was basically in good shape. But there were holes as large as five inches in diameter in the curls, nostrils and the right eye of the face modeled by Bartholdi on that of his mother, Charlotte (the arms are wife Jeanne-Emilie's). Over time, other small holes resulted when rivets holding the 300 lapping pieces of metal skin to the iron framework inside popped out.

The most excruciating external decision was whether to renovate the original torch or build a new one. The original was battered, waterlogged and had also been badly bastardized over the years. Bartholdi's initial design, displayed in Philadelphia in 1876 and then in New York, probably included a flaming metal

Spencer Davidson is a free-lance writer who for many years was an Associate Editor of Time *magazine.*

Statue's spiky crown had been removed. Aluminum framing cost $2 million and weighed 300 tons.

Cleaning paint from inside the crown, crewmen use liquid nitrogen cooled to -350 degrees F.



Clad in a protective suit, workman uses kitchen broom to brush bicarbonate of soda from outside of statue.

torch, coated in opaque gold. But shortly before the statue was dedicated, portholes were cut for nine lamps inside the torch so the statue could perform double duty as a lighthouse. The result looked like a glowworm. Later, spurred by what National Park Service architect John Robbins calls "the American mania for practicality," more holes were added, along with an octagonal skylight. In 1916 Gutzon Borglum of Mount Rushmore fame was commissioned to replace most of the metal with octagonal glass panes to make the torch look more like a flame, but eventually the interior glow was dimmed, and now the torch is to be illuminated from outside.

For the recent refurbishing it was decided to make a new torch following the original gilded concept. Artisans skilled at repoussé, the pounding of metal into shapes, were interviewed in the United States, West Germany and France. Eventually the contract was awarded to Les Métalliers Champenois. Ten *repousse-*

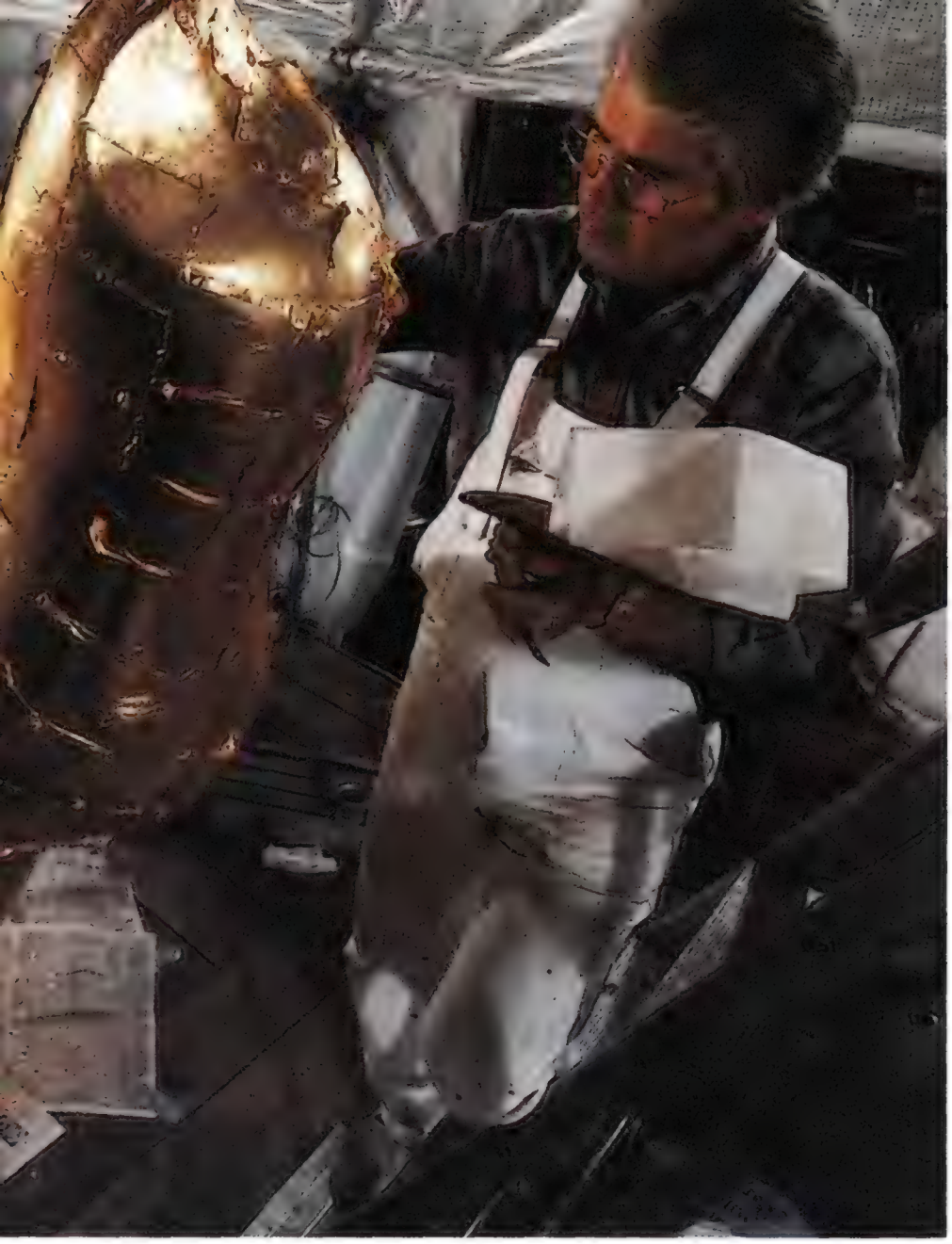
French worker rivets handmade copper socket inside torch base to help anchor the steel support bars.

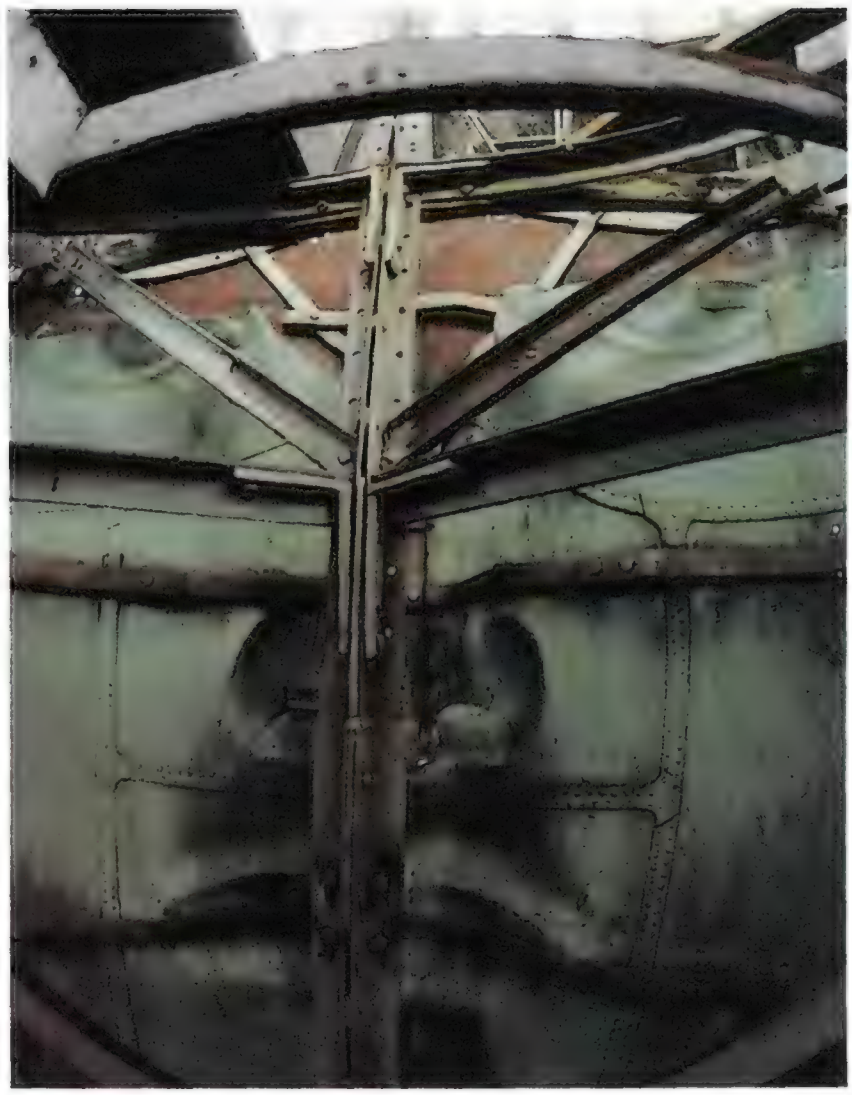
Steelworkers engraved their names on new support bar, but inspectors insisted names be removed.

urs from the city of Reims were dispatched for a year's labor on the new torch in a workshop on Liberty Island. French craftsman Jean Wiart, 33, remembers his first view of the great creation that the crews had heard so much about in Reims: "It was so big, so incredible. We had a feeling that we were looking at the most important architecture that Man had ever made." The demand for repoussé is dwindling in Europe, so Wiart and three others of the ten have decided to stay in the United States. "America," he explains, "is more ready for change than France."

The new torch, gilded with hand-hammered 24-karat gold leaf, was hoisted to its place of honor last November 25. The old torch (pp. 74-75) will become a display in the museum inside the pedestal. Says Larry Bellante, project director for the Statue of Liberty-Ellis Island Foundation, "It will make a dynamite impact. Outside, the torch is dwarfed by the statue. Inside, it's a presence." Along with the museum, extensive renovation is being completed inside both pedestal and statue. Bartholdi figured that people would mainly view his statue from afar. The most he anticipated in the way of access was ladders for workmen. In later years, 171 spiral stairs—all leading up to the crown with its 25 windows—were added. So was an elevator. To cut down waiting times, the elevator has been replaced with a glass, two-level hydraulic lift. The crown has been fitted with new, specially-treated glass. The stairs have been given stainless-steel treads, resting platforms and vastly more efficient ventilation. (In the close confines of the stairway, the temperature sometimes rose to as much as 120 degrees.) Remembering the proclivities of many young American sightseers, the renovators also added graffiti-resistant finishes to walls and stairways.

Bartholdi was a competent enough artist but the technique for keeping 151 feet of three thirty-seconds of an inch copper in shape baffled him. At one point he considered filling the statue with sand but was saved by Gustav Eiffel, who put aside whatever dreams he may have had about an iron structure in the middle of Paris to shore up Miss Liberty. Eiffel designed an iron inner framework much like a dressmaker's dummy with armature bars conforming to Liberty's feminine form. They were, says Kleiner admiringly, "a damned good job." Eiffel separated the iron and copper with asbestos pads to prevent a corrosive reaction if they touched. But moisture from leaks eventually destroyed the pads and hastened corrosion. The engineers decided this time to replace all 1,799 of the iron armature bars with





The face, seen from inside the head, still has original supports. The crack in right eye was later fixed.

French artisan Robert Gohard (right) and son Fabrice give torch some last delicate touches of gold leaf.

stainless-steel replicas; ten others in the sole of Liberty's right foot are in acceptable shape and remain as a testament to Eiffel's skill.

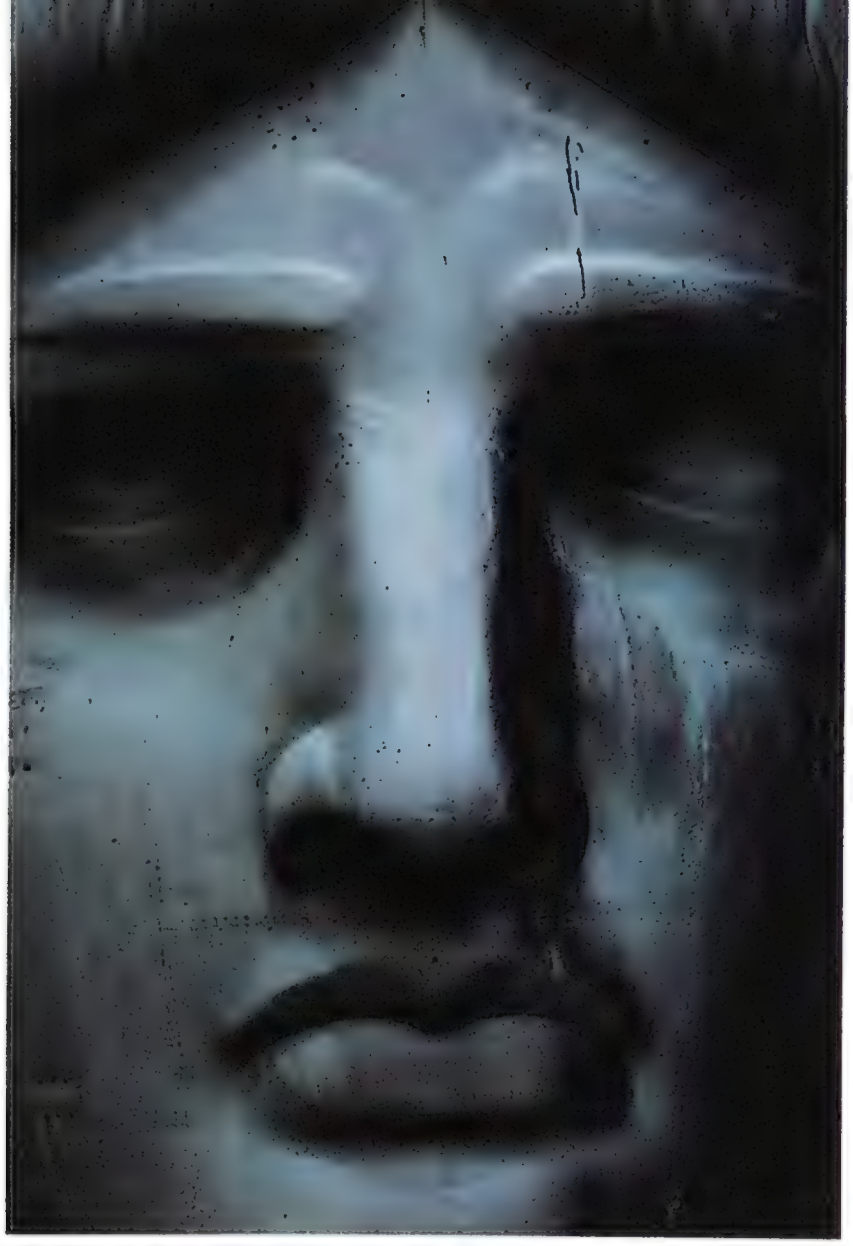
As well as replacing armatures, the contractors had to remove seven layers of interior paint and two layers of coal tar daubed on 70 years ago as waterproofing. Everything from sand and glass beads to chemicals and walnut shells was tried on the paint—with slight effect. The clean-up time stretched into months. Eventually, Columbia University's architectural conservator Frances Gale suggested a new technique: liquid nitrogen sprayed at -350 degrees F. The spray froze the paint, which contracted and dropped off, a process that took only four weeks.

Unfortunately the liquid nitrogen did not work on the interior tar. Nor did walnut shells, or sugar or corn cobs. But commercial bicarbonate of soda, similar to the substance that dentists use to remove tooth stains, accomplished the job. With one side effect. The bicarb, leaking through holes and seams, dripped down the outside and turned streaks of Liberty's familiar light green copper patina a turquoise blue. This was corrected with water baths, which, with a little help from the weathering process, eliminated the alarming possibility of a bright blue colossus suddenly guarding the gateway to the New World.

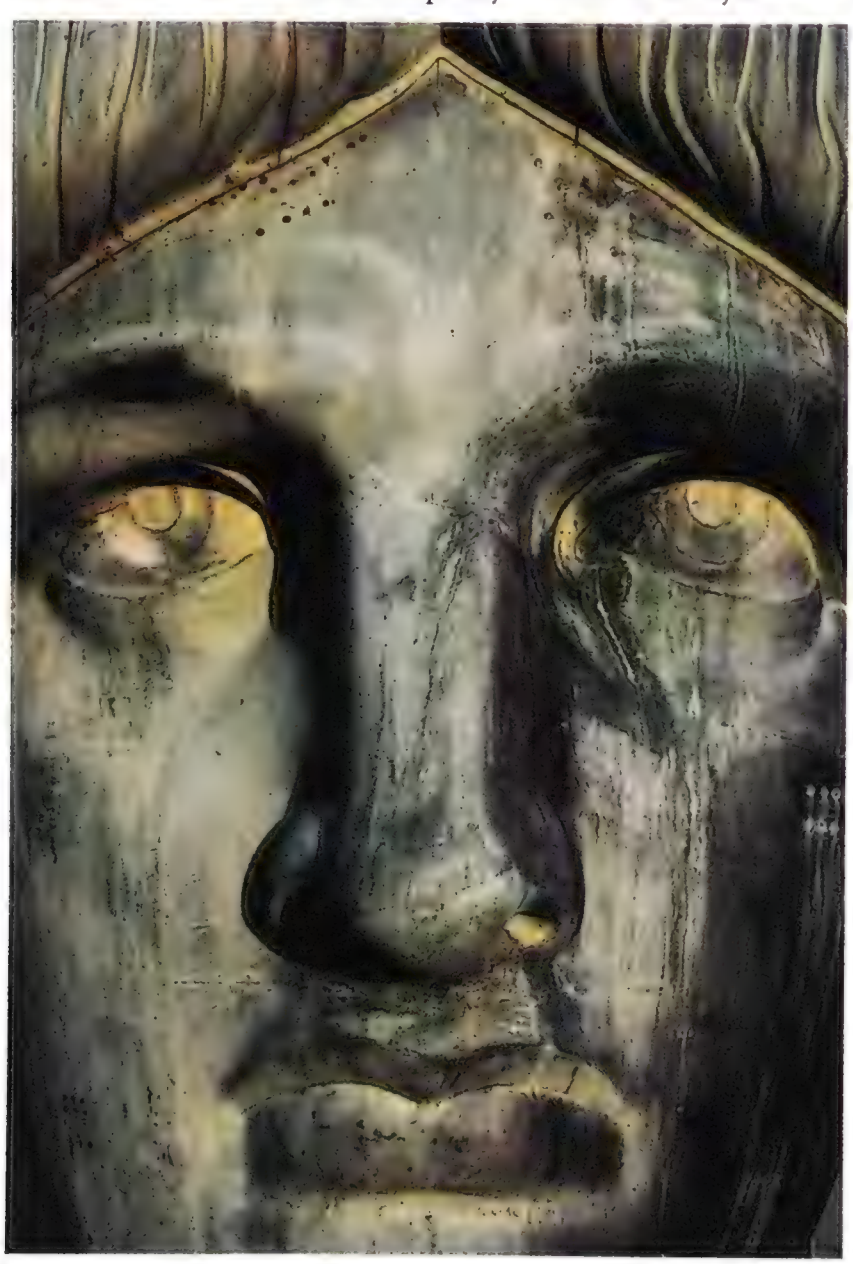
To maintain the statue's rigidity, the armatures were replaced with stainless-steel duplicates a few at a time. The technique was unusual; stainless steel is not known for its malleability. The copies were bent, annealed at 2,050 degrees F, sandblasted to remove contaminates and bathed in nitric acid for protection—all within 36 hours, the longest period experts felt that any armature could be safely kept out of place. No new paint or waterproofing will be necessary to protect the new armatures, though the refinished interior surfaces have been treated with a silicone sealant.

Such work could probably have been done in far less than 30 months if Miss Liberty had been a mere 20-story office building or was located across the harbor on Wall Street, or anywhere except on a small island. Workers had to face tides that at times varied in the course of a day by as much as six feet, making it logistically difficult to haul in supplies and unload heavy construction equipment such as cement trucks. Still, with an urgency that mounted as the rededication day grew closer, crews maintained schedules by working double shifts and Saturdays.

By the beginning of spring they were ready to tackle the final outside work. A new pier for the sightseeing



Before cleaning (above) face still had lovely patina. Afterward (below) it was streaked with bicarbonate of soda stains that will rapidly weather away.



boats. New walkways and plazas and new landscaping around the statue base, including 200 trees, mostly lindens and Japanese black pines. A new lighting system, designed and contributed to the renovation by General Electric, was also finished. Two types of metal halide lights will be used, one to highlight the overall patinated surface of the statue, the other to emphasize Liberty's folds and shadows. Mounted at the water's edge in banks of specially-designed reflectors, the new

A flatbed truck gets ready to carry original torch on first leg of journey to the 1984 Rose Bowl Parade.

beams were tested in March in preparation for the July Presidential switch throwing. The handful of supervisors privy to the test were impressed, particularly since the new system will provide a three-dimensional effect far brighter than the one it replaces, and with just one-quarter the wattage.

No one will be happier when the work is done than David Moffitt, the Park Service superintendent in charge of the statue. For nine years Moffitt and his family have lived on the island, overshadowed by their famous neighbor but enjoying the beauty and occasional tranquility of the scene. For nearly three years, however, they have also had to share it with jackhammers and compressed-air machines. Moffitt, who hopes to move on to a new post when the reopening is over, is delighted with all the improvements. "I always thought the landscaping was, well, mediocre," he admits. "Now it has been done right."

When work is finished, old torch will go on exhibit in a special museum being readied in statue's base.

Comparis
been m

Honda has a way of bringing out the best in everyone. It's called the Accord.

Whenever we introduce a new Accord, everyone else returns to the drawing board. To try their best. Now we've done it again.

This is the new Honda Accord LX 4-Door Sedan. There's nothing else like it.

The hood is lower for aerodynamic efficiency. Also, you can see better over it. The reason we can make the hood so low is that the car has a unique suspension. A double wishbone on all four wheels. It's the first time this suspension system has been used on a front-wheel-drive car. Race cars, however, have used it for years.

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You'll also be very comfortable. There is more headroom even though the roofline is lower. The car is also wider.

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ons haven't ade yet.

Conveniences have been well considered. This luxurious car comes with air conditioning. A new electronic stereo system with a cassette player. There are power windows and door locks. A power radio antenna. Dual power remote mirrors.

You might call the engine more of a powerhouse. Its size has been increased to two liters. And its mounts have been redesigned to absorb vibrations. It's smooth.

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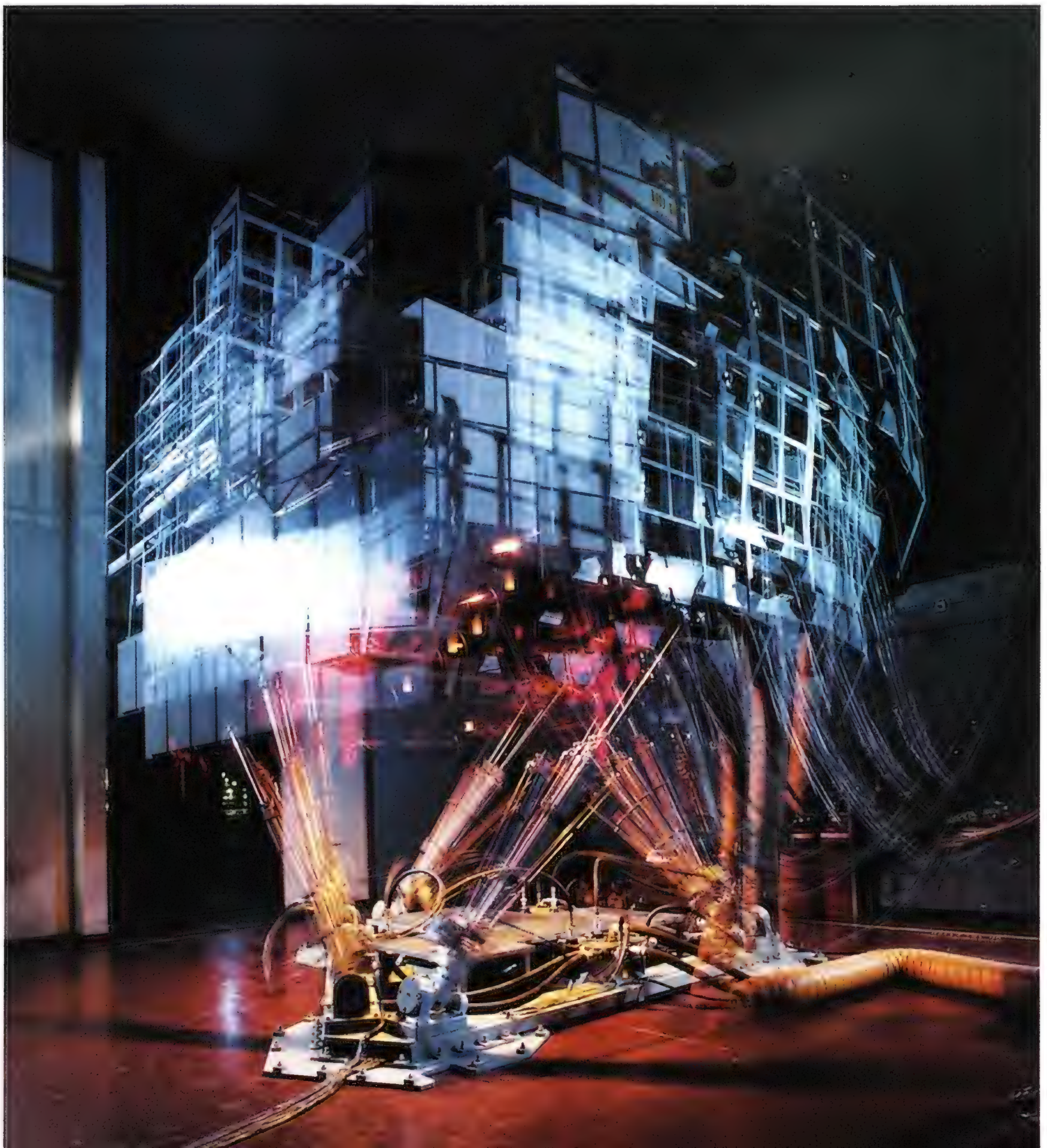
While these extras might be available as optional equipment on other cars, they come standard on this car. We invite your comparison. HONDA

The New Accord

By James R. Chiles

When pilots' worst nightmares come true—in simulators

Flameout on takeoff or a microburst on final approach: fliers learn to cope with them in machines that are now nearing perfect realism



Thunderstorms were moving across the Dallas-Fort Worth airport on a Friday afternoon last August as Delta Flight 191 made its final approach. The L-1011 flew into severe turbulence and suddenly dropped onto a highway several hundred yards short of the runway. The aircraft skidded, then an engine under the left wing dug into the ground, spinning the plane to the left. The tail section broke off as the plane slid into two water tanks. The 136 passengers and crew members who died were trapped in the burning fuselage; 27 passengers and three flight attendants in the tail section survived the crash.

Flight 191 was the victim of an atmospheric phenomenon recognized only in the past decade: wind shear, a sudden change in wind speed or direction, sometimes accompanied by a violent downdraft. A head wind suddenly becomes a tail wind, and a plane's speed through the air drops by tens of miles per hour, sometimes enough to cause it to lose flying speed. The first rule for pilots is to avoid wind shear: delay takeoff, go around instead of landing. But it is possible to fly through some—though not all—wind shears. When the aircraft suddenly loses airspeed, the pilot must immediately push the throttle forward to maximum power

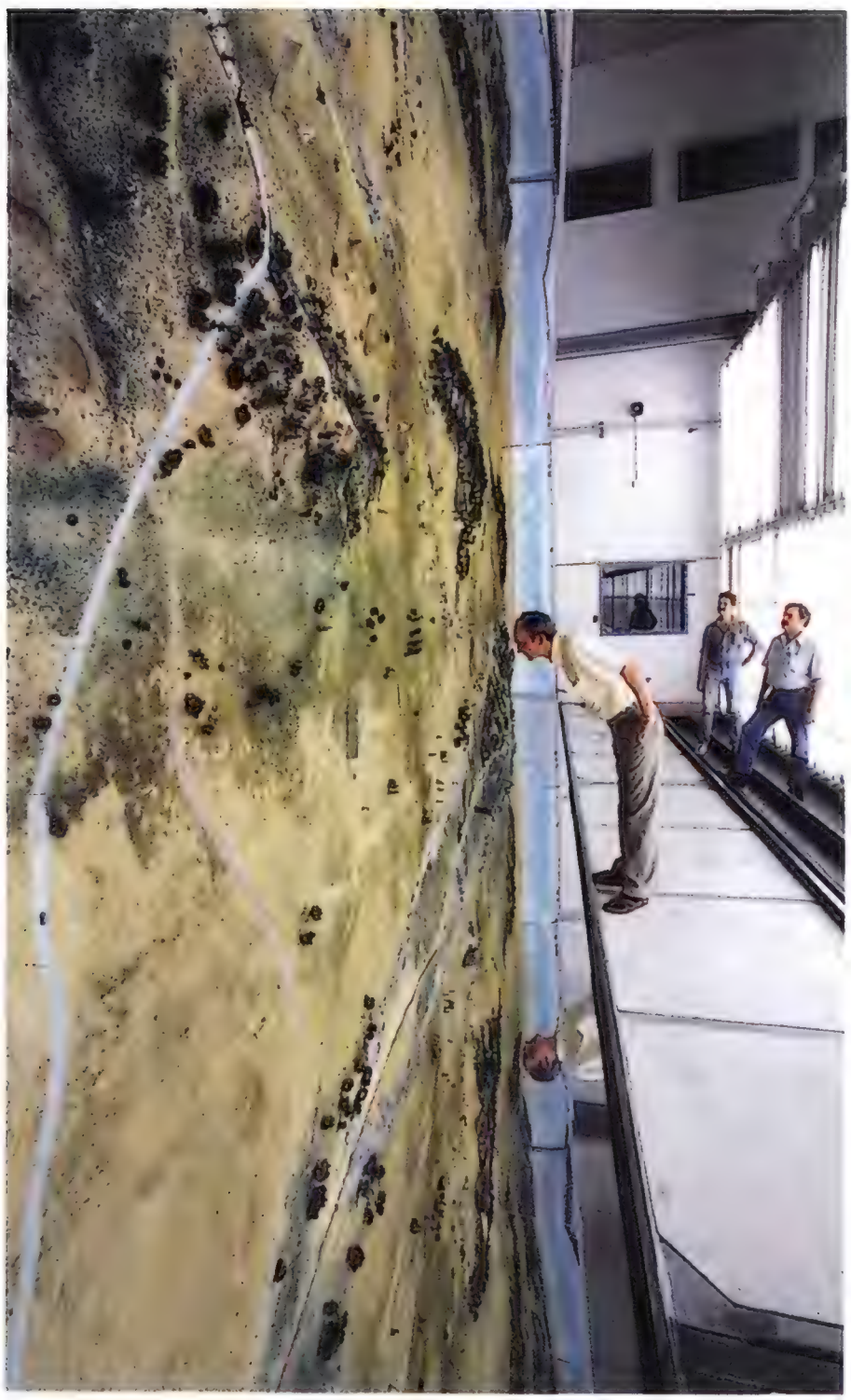
UPI/Bettmann Newsphotos

Opposite: In simulator at United's training center, pilots get the sensation of flying. By replicating hazards like wind shear, machines may help pilots avoid fate like that of 1985 crash in Dallas (above).

Color photographs by Roger Ressmeyer

Simulators make nightmares for pilots

The Link "blue box" trainer, with wings and tail, helped thousands of World War II pilots learn to fly.



Bob Shipley at NASA-Ames, California, checks model board that supplies views for helicopter simulators.

and—contrary to all instincts and training—pull the nose up instead of pushing it down.

Airline pilots can now practice flying through wind shears. They do it not in a jet 100 feet above the ground, where a mistake can mean a fiery death, but in a flight simulator where, in an exact replica of a transport cockpit, they encounter the worst nightmares that pilots can face. A combination of regulatory requirements and technological advances have brought simulators to just a few steps short of perfect realism. Since 1980 it's been possible for an experienced pilot to be checked out for a particular airliner solely on the basis of simulator training, and for him to fly passengers the first time he's ever been in the real aircraft.

There's no question that simulators have made training exceptionally safe. But passengers can't fly anywhere on simulated airliners, and the record of passenger-bearing flights is uneven: 1984 was the safest year on record for commercial aviation worldwide, but 1985 was the worst, at 2,089 deaths.

The accidents started with a crash into a Bolivian mountain on January 1, 1985, and continued with horrifying regularity through the fatal crash of singer Rick Nelson's DC-3 on New Year's Eve. The flying public was shaken. Early this year at Chicago's O'Hare airport, after a jet engine on a taxiing United airliner belched fire for several seconds, two passengers rushed across the cabin, opened a door and inflated a slide chute without pausing to notify the crew. "They really

shouldn't have done it," said a United spokesman later. "They were never in any danger."

Airlines have already taken steps to prevent repeats of some 1985 accidents, and simulators are helping. Within three months after the crash of the Delta L-1011 at Dallas, other airlines were entering the preliminary data in their own simulators for training and analysis. The importance of crew distraction in causing the January crash of a Galaxy Airlines turboprop at Reno, Nevada, has reminded airline pilots of the benefits of sessions conducted in flight simulators that train crews to coordinate their efforts and reduce errors. The fatal Japan Air Lines flight over Japan (in which a pressure-bulkhead rupture in the tail severed control lines) prompted simulator research by at least one airline on how a forewarned pilot might keep control of a 747 without any hydraulic systems.

The proposition that a cockpit mounted on hydraulic legs can deceive experienced pilots into thinking they're flying may be hard to accept. Probably harder to swallow is the idea that some simulators reproduce the flight characteristics of a specific airplane so precisely that engineers can use them to investigate accidents and predict the behavior of the real airplane. But, for an exclusive class of simulators built in the past ten years, it's true. Besides their services for civilian and military pilots, simulators are also scaring the wits into ship captains, nuclear-power-plant operators, tank crews and helicopter gunners. Astronauts routinely train for thousands of hours in NASA's shuttle-mission simulators.

The forefather of all this wizardry was Edwin Link (SMITHSONIAN, May 1980). At age 23, shortly after Lindbergh's 1927 solo flight to Paris, Link learned to fly. The following winter he started tinkering with spare parts in the corner of his family's automated pipe-organ and nickelodeon factory. By 1929 he had an air-powered flight trainer mounted on a pedestal that allowed it to turn and bank and pitch. In later models the pilot sat beneath a hood that simulated flying in clouds; as he operated his controls to follow radio beacons, the instruments on the panel registered changes in altitude, speed and heading. Link opened his own flight school featuring his instrument trainer and tried to peddle other trainers to the military, but for several years his principal income came from selling rides in the trainer at amusement parks and air shows for a quarter. Then in 1934 the Army Air Corps turned to the trainers to drill its mail fliers, and Link was on his way. The company sold 10,000 "blue boxes" (opposite, top) by the end of World War II.

James Chiles is a private pilot with 50 hours of flying time, all in small planes. His article on plastics appeared in the November 1985 issue.

Simulator provides a pilot's-eye view of runway 22 at New York's La Guardia, 25 seconds before touchdown.

Link trainers are still in use—at its Oklahoma City training center, the Federal Aviation Administration owns four refurbished models dating back to the 1940s—but even during the war it was clear that more could be done to make training safer. There was no way to learn airplane handling at the time except in a real airplane because trainers of that era didn't have the computing power to duplicate the flying qualities of any particular airplane, and they didn't have the visual references that pilots need to make good landings. By the '60s, simulators could handle flight at cruising altitudes, but it took another ten years before the data was available and simulators were smart enough to reproduce the motions of a plane near the ground, where its flight characteristics change.

By 1970, advanced simulators for airlines featured digital computers to run the instruments and control the cockpit motion, and "model boards" for the visual display. I watch one in action at American Airlines' Dallas headquarters. This board, which has the look of a large model-railroad set (with a city, highways, farms, lakes, trees and a good-sized airport), is tipped on its edge. It's lit to painful brightness by powerful lights. On a track between the board and lights runs a gantry with a motor-driven camera and mirror arrangement. The motors are controlled by a computer that interprets control movements made by the pilot in the nearby simulator.

Model boards were clearly better than blind flying, but they had obvious limits: though the airport's radio beacons could change, pilots always saw the same landmarks; the boards covered only a few dozen square miles; the lighting bills and occasional collisions between cameras and boards were expensive and each

board could handle only one camera, which meant the pilots had no side views. Less serious were the practical jokes: I heard stories of Braniff trainees startled by a dragonfly pinned to a hillside, and of a toy aircraft carrier in a lake on one of American's boards.

Replacing model boards are powerful computers that store three-dimensional models of many airports and allow pilots to fly around them. Simulators with computer-generated images had first seen use back in the '60s and they played a key part in astronaut training, but it was 1972 before the first airline model went on the market. The early systems for airliners provided only one or two thousand points of light on a dark background. With a little imagination, it was enough to suggest city and airport lights on a rainy night.

The latest visual systems for airliners (sold by McDonnell Douglas, Rediffusion Simulation and the Link Division of the Singer Company) can show hundreds of surfaces as well as thousands of lights. Their computers (which are separate from those that control the simulator's hydraulics and instruments) first calculate what lights and patterns are visible outside the airplane windows. Then they subtract what is covered up by something in the foreground, and color everything in. Moreover, they manage this for three to five separate views outside and recalculate everything up to 60 times a second. As an option, some systems add texture patterns to the surfaces, helping pilots judge height and distance. All these lights and surfaces are based on elaborately constructed mathematical descriptions of real airports and cities.

The best way to appreciate a late-model simulator is to fly it. My logbook shows a few more than the 40 hours necessary for a license to fly the smallest and simplest propeller planes. But with the help of Jim Kater, manager of training for Delta (p. 85), I have the chance to fly an advanced Boeing 737 simulator at

A 737 banks as it flies down the Potomac River toward simulation of Washington's National Airport.

Delta's training facility in Atlanta. The 737 is a twin-engine, 58-ton, 107-passenger airliner that bears little superficial resemblance to the only airplane I know how to fly, a Cessna two-seater, but I figure I can keep control of it. I'm a little less confident about my ability to land it on instruments because my only training for this kind of landing has been with a $49.95 video game that runs on personal computers.

The machine is occupied and we walk around the simulator while waiting for our slot to open. The machines are so expensive and demand is so high that Delta runs its ten simulators 18 hours a day, seven days a week. This one, Delta's only 737, is a rectangular white box on top of six hydraulic legs set in a tripod arrangement, making a contraption almost 20 feet high. Altogether, it has no resemblance to an airplane, unlike Link's early trainers, which had miniature wings and a tail. In operation, it has the look of a giant spider trying to get to its feet under the influence of alcohol. It swoops and sways, rocks and dips. Electronically synthesized roars, whines and thumping noises

View was frozen to make the picture; the details appear much more clearly when scene is in motion.

emerge from the loudspeakers inside. Then a bell rings and a walkway descends to connect the simulator door with a set of stairs.

When we enter, a brief look at the instructor's station—a control panel and computer screen behind the captain's seat—tells Kater that the simulated plane is at a gate at the Atlanta airport. From the instructor's seat forward, the rest of the chamber is a perfect reproduction of a 737 cockpit. With a few button pushes, Kater relocates us to a gate at the Washington, D.C., National Airport and beckons me into the copilot's seat. As I struggle with the seat controls, he reaches back to press a button on the instructor's console that starts both engines immediately, and I hear the turbines' whine rise in volume. With a slight nudge, an invisible tug pushes us backward onto the ramp.

This model is unusual among airline simulators in having a wide-angle, 150- by 40-degree display just outside the windows. Delta leases the simulator from Boeing. Most visual systems use an arrangement of mirrors and monitors that allow each pilot only a view ahead and to one side. On this half-million-dollar display, which uses a large curving mirror, a curving screen and three video projectors, I can look out Kater's side window and see the loading gate sliding by. The time is dusk; this simulator can produce daytime scenes, unlike most simulators, but night and dusk conditions are more realistic.

Kater begins the session with a takeoff and a return to show me how the wide-angle display assists in making the difficult visual approach to National Airport, which requires following the curves of the Potomac River. Off to the left, among a spray of lights representing the city, I can see the Washington Monument, the Mall and a circle of lights around the Lincoln Memorial (left). Ahead are the Potomac bridges and on my side, the airport. He makes an effortless landing, the tires screech and he steers us back to the loading gate.

Landing a 737—a novice misses by a mile

While flying airplanes for Delta before he took over the training department, Kater made 23 years of landings at National. He has silver hair and a matching mustache and the friendly yet firm manner that pilots recall in their favorite instructors. When he's upset and discussing accidents, his only sign of disquiet is a tendency to blink more rapidly.

After a few minutes I say I am getting the hang of it and Kater moves us back to Atlanta to let me fly. He turns the controls over at the beginning of the runway, with an injunction to keep the plane on the centerline with the rudders. I push the twin thrust levers forward cautiously and we start rolling. I can feel the bumps of the tires on the tar strips increase in frequency and I feel a modest acceleration. He has dialed in a calm evening, so in a short time I pull back on the wheel and we're climbing smoothly into the clear air over Atlanta.

I make a few turns back to the airport and he reminds me to keep the nose up to maintain altitude. Occasionally alarms ring and a mechanical voice yells "PULL . . . UP!" and "GLIDE SLOPE!" at me. I find the wheel demands a good deal of pushing or pulling until Kater shows me how to use the trim switch on my right hand grip, which adjusts the elevators on the tail to balance the plane. It produces an authoritative clacking noise from a flywheel on the console to my left and I begin to feel more like a pilot.

Not so difficult, I say to myself, and I steal a few seconds for sightseeing as we approach the runway. But I decide I've underestimated the challenge after crashing a mile short of the airport. The screen and motion systems freeze up. (The motion systems are fully capable of tossing the crew around in a crash, but violent motions tend to throw the delicate visual systems out of alignment. Kater had anticipated my error by press-

United pilot John Perkins, here in simulator, helped one crew fly out of a wind shear on a real takeoff.

ing the "crash inhibit" button, which locks the motion systems during a crash.) Kater, who has been lowering the flaps and pulling back the thrust levers for landing, explains that I didn't keep up with the changes in the airplane's angle that his adjustments caused.

"So we don't leave you with a bruised ego, let's try it again," he says equably, and after takeoff he lets the autopilot fly us back onto the Instrument Landing System radio beam. "Your controls," he says and disconnects the autopilot. "It's just like playing Pac-Man," he says while I concentrate on keeping a small orange ball in the center of two moving yellow lines on a gauge in front of me. I hold the airplane together on the second landing and come out of the cockpit slightly breathless.

This kind of joyriding is anything but cheap. A typical advanced simulator rents for $400 and up, hourly. Bob Glenn, an engineering manager at United, says his company expects to pay about $8 million for a top-of-the-line Boeing 737 simulator. About $300,000 of this goes to Boeing for the extremely-detailed aircraft data necessary to make the simulator fly accurately. Boeing produces the aerodynamic data by hanging instruments all over a real 737 and flying it.

Even at these hourly rates, simulators save bushels of money. Delta estimates that real airplanes cost ten times as much to operate. Altogether, says Kater, Delta saved about $65 million in 1984 because of simulator training. United saved about $10 million last year just in fuel costs.

Generic flight tests for experienced pilots

Simulators are used at many points during airline training. Bill Helker, a training manager for Northwest Orient, explains how it works at his airline. A prospective pilot comes to Minneapolis with about 2,700 hours of flying time. But the logbook is only one indication of skill, so Northwest Orient gives him a generic flight test in one of the company's simulators, in which he flies patterns and makes landings on instruments. An instructor sits in the right seat and keeps the rest of the plane running.

Once hired, a typical trainee will spend eight to ten weeks in Minneapolis learning how to be a flight engineer for a Boeing 727. In the last few weeks, he'll spend ten four-hour sessions in the simulator. He'll take his final examination, called a check ride, in the simulator too. When the flight engineer moves up to copilot and later to pilot, he'll come back for more simulator time. They will all come back regularly for annual or semiannual proficiency checks and to get qualified on particularly difficult airports, such as the one at Hong Kong.

Most simulator time is occupied with drilling the pilots on how to handle emergencies in flight. The instructor, sitting at his computer console in the rear of the cockpit, can do terrible things to the engines, fuel supply, instruments, landing gear, electrical systems and weather.

In January I sit in on two days of simulator instruction that Braniff provides on a contract basis for NASA, training one of the three 747 crews responsible for ferrying the space shuttles from California to Florida. The NASA pilots fly maneuvers near the Dallas-Fort Worth airport, interrupted by constant malfunctions. An engine flames out on takeoff and another catches fire in midair. Generators trip out. Radio facilities fail. "It's 20 years' worth of emergencies" in eight hours, says Joseph Algranti, captain of his three-man crew.

Braniff instructors can also choose from six windshear profiles to spring on pilots in the simulator. As I visit, the airline is preparing a seventh, says Ray Asay, Braniff director of flight training: one based on the

Delta crash at Dallas. Although the legal questions are not yet settled, there is general agreement that the Lockheed jumbo jet was caught in the turbulence of a violent plunging column of air, known as a microburst, just prior to landing.

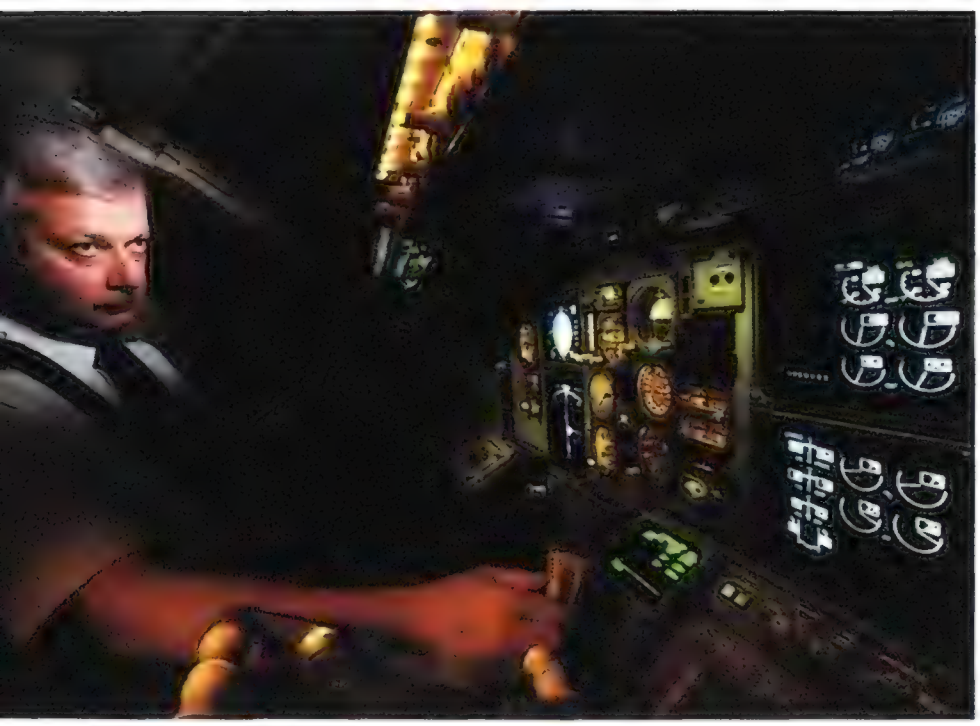
The first airline to absorb the 191 flight data into its simulators was United. By November, it had programmed DC-10 and 727 simulators with information from public hearings, and crews were trying it out. Bob Ireland, an engineer with United's simulator program, says the United tests are no reflection on the Delta 191 crew; in the simulator tests the crews know exactly what is coming and are primed to take immediate action. "There's no question that the crew on 191 was, and had every right to be, disoriented. It was a terrific shear."

Jim Kater of Delta points out that no simulator can fully reproduce the forces of the Flight 191 shear. "I think that incident was probably unsurvivable," he says. Delta started teaching pilots in simulators how to handle wind shear in 1975, but Kater argues that avoidance is a much more important technique.

Many pilots agree that some wind shears are not survivable. "That's been one of the most hazardous ideas—that good pilots with the right stuff who don't eat quiche can fly through these things," said Bill Melvin, a pilot and official of the Air Line Pilots Association, right after the crash. "The particular microburst in Dallas was extremely severe. The work we're doing is to prove that there are certain shears that you can't fly out of."

John Perkins, a flight-standards and training manager at United (opposite), has been through a wind-

Inside simulator, Mike Bloodhart alters conditions pilots face; Leslie Oschsner is the flight engineer.



Delta's Jim Kater "lands" in a glass cockpit; even images on the instruments are computer-generated.

shear incident himself and he says simulator training can take some credit for the fact that he and his airliner survived. On May 31, 1984, he was a senior training captain. United was short of flight engineers that day, so he filled in on Flight 663 when it left Denver for Las Vegas. Just after the 727's nose gear came off the pavement, a wind shear stole 20 knots from the plane's airspeed. The plane finally struggled into the air at the end of the runway, but couldn't gain altitude. Perkins reminded the pilot to keep the aircraft pitched up. A thousand feet beyond the runway's end, the airplane smacked into a 13-foot-high navigation antenna and suffered a long gash in its belly. But no one was injured and the plane climbed out to return for a safe landing at Denver.

Providentially, at the time of the incident Perkins was helping to design a wind-shear training program for United. "The pilot had been one of our guinea pigs and he had been in the simulator," Perkins recalls.

There is one last simulator session between a new pilot's final examinations and the real world. It's called LOFT, for Line Oriented Flight Training. It's the closest thing to acting that most pilots ever do. In these four-hour sessions, an instructor and the students attempt to simulate an entire flight, including problems that a crew might experience out in the real world. They start with weather briefings, fill out their standard forms and end with either a crash or a safe arrival at the gate. "It's a structured flight," says Tom Nunn, director of flight training for Northwest Orient. "The instructor has the script already made out. He takes an observer's role and doesn't interfere with the flight. He operates the simulator and he provides communications—that's all."

One crew that had not benefited from a LOFT ses-

Flight attendants and pilots practice evacuation of a simulated Boeing 767 at United's flight center.

sion were the pilots and engineer aboard the Galaxy Airlines charter that crashed in Reno, Nevada, in January 1985, killing 70. A year later the National Transportation Safety Board assigned the probable cause of that accident as a breakdown in crew coordination due to distraction. Shortly after takeoff, a loud vibration (found afterward to have been caused by an open service door in a wing) caused so much concern on the flight deck that the pilot ordered the engines throttled back. The plane lost airspeed and crashed about a minute later.

The realism requirements of LOFT are the main reason that simulator makers now include gates, signalmen and push-back tugs in their visual systems' bag of tricks. The sessions are normally in two flight legs. One is normal. During the other, the instructor puts pressure on the crew with a combination of air-traffic-control problems, bad weather, passenger complaints and engine difficulties. If the simulator represents one of the latest airliners, the script might call for a breakdown of the navigational computer.

If the crew's response to their problems is diversion to an unexpected airport, the instructor has to improvise off the script. "It requires the simulator operator to move very quickly to stay ahead of them and provide the navaids, airports and weather," says Jim Kater. If the crew allows small problems to snowball into big ones and plummets into a death dive, the instructor will not interfere. The crew critiques itself later in a debriefing and the instructor suggests how they might have managed the situation more effectively.

John Lauber, a member of the NTSB and himself a 727-rated pilot, says that minor errors are fairly common in ordinary airline operations. Normally, the crew prevents any one mistake from cascading into a whole series of mistakes by telling each other what they're doing, following checklists and warning of impending problems. But sometimes (particularly during periods of heavy work load) the usual safeguards don't work: the crew members stop communicating with one another, one person keeps getting interrupted by irrelevant demands, or the captain gets distracted by a mechanical problem and attempts to fly the plane and troubleshoot simultaneously. About two-thirds of commercial aviation accidents result at least partially from human error.

Those in the field are convinced that simulators have done much to reduce error. "There's no question in my mind that simulators have substantially improved air safety," says Clayton Foushee, a research psychologist with NASA, "but we can't prove it because so many things have been happening to the industry simultaneously." One of those things is deregulation, which has ignited a boom in the airline industry. Pilots are entering with less experience than formerly and moving up faster in the ranks. Simulators will have to provide some of the seasoning.

The Federal Aviation Administration is so convinced of the value of all this simulator grilling in emergencies and LOFT situations that, for new pilots trained on certain simulators, the airline can legally place the novice on revenue service the first time he takes his assigned position in the plane. For example, a seasoned copilot on a 727 who then trains as a copilot on Delta's 737 simulator could take his place on a passenger flight immediately after his simulator sessions and check-ride. Like all new pilots and engineers, he would have an inspector by his side for the first 25 hours to prevent errors.

After the simulator: landing a real plane

But Delta, like some other airlines, takes the fledglings out to fly an empty airliner anyway "to build their confidence and for landing practice," says Jim Kater of Delta. These sessions are strictly routine: instructors do not throttle back to fake an engine flameout.

Manufacturers keep simulators specially equipped for engineering research. Recently Boeing used evidence from simulator tests to support its argument in a Seattle federal court that an Air India 747 crash in 1978 was not due to faulty cockpit instruments. Citing legal reasons, Boeing spokesmen refused to comment on whether the company has used its 747 simulator to evaluate the August 1985 crash of Japan Air Lines Flight 123. That accident killed 520. Unofficial reports indicate the chain of events started with a failure of a

pressure bulkhead in the rear of the cabin that caused severe damage to the tail and the rupture of all four of the 747's hydraulic control lines. The crew kept the crippled plane in the air for more than 30 minutes, until it hurtled into a mountain.

That crew's valiant effort prompted Tread Sheffield, a training captain for Braniff, to make an informal test on his company's 747 simulator to see whether he could maintain any control without hydraulics, which normally operate the plane's rudders, elevators, flaps and ailerons. He says he kept marginal control of the airplane using variable thrust on the outboard engines to change directions, while his copilot controlled the pitch of the airplane with the flaps (which have an electrical backup system). Sheffield quickly adds, however, that the machine could not simulate the actual loss of a large section of the vertical stabilizer.

In the past decade, simulators have taken big leaps in realism and price. At the far end of this scale are simulators for the military: the system for the Apache attack helicopter cost $30 million and included graphics and special effects far beyond anything available for airline simulators.

The buyers of airline simulators aren't likely to pay for that kind of realism. In fact, NTSB member John Lauber says the most pressing need is in the opposite direction: low-cost simulators for small regional and commuter airlines. Currently, many advanced simulators cost more than the propeller planes these operators fly, so the owners train pilots on the real planes—thus foregoing the advantage of emergencies and LOFT sessions that only simulators can provide. Manufacturers have designed new simulators for the smaller planes. Microprocessors will bring costs down enough to make them economically feasible.

This cost-saving trend is fine with us would-be pilots. But costs will have to drop quite a bit before we'll start seeing realistic flights aboard airliners and fighters down at the video-game arcades. Till then, we'll be saving our quarters.

A simulator at NASA-Ames gives pilots a taste of the instrumentation they may be using in the 1990s. This cockpit may presage that of hypersonic "Orient Express" that might fly New York-Tokyo in three hours.

By Helen Dudar

Onward, upward and westward with the fine arts

A combination of talent, good taste, civic pride and no small amount of money is creating a totally new look for Los Angeles

Among the predictable indignities of life in Southern California are fire, flood, earthquake, smog and the unconcealed scorn of the Eastern art establishment. Marcia Weisman, a Los Angeles collector who once canceled plans for a new house in order to buy a Jackson Pollack, goes art hunting in New York armored against rudeness: someone is bound to ask why she is helping to build a museum *out there*. Gifted artists labor *out there* in the certain knowledge that serious attention may elude them unless they excite the New York art crowd, and local entrepreneurs of great wealth and power have been known to succumb to a gnawing sense of cultural inferiority.

A Second City complex dies hard. The fact is that right now, there is no art scene in the country as yeasty as Los Angeles'—Rhinestone City is on its way to becoming a cultural pearl of the Pacific through a happy conjunction of good artists, heavy money and dedicated museum makers. The hills are alive with passionate collectors, some of them so enslaved by the charms of acquisition that they employ full-time curators, brick up windows to add space for new works and send the overflow on international tours.

Big-league collectors can go anywhere to buy art and are most likely to go to New York—art capital of the world or, as one West Coast artist sardonically calls it, "The Imperial City." This may help to explain why although good galleries are to be found in Los Angeles County, they do not begin to approach the abundance of, say, pricey womenswear specialty shops. Nor can they sustain the burgeoning population of producers of art. Tony Berlant, the metal-collage artist, had his first California show in 1963 at the age of 22; with perhaps only slight exaggeration, he calculates that at the time, "You could have rounded up everybody in the county who was serious about art, all the artists and all the collectors, and put them on one bus and driven off."

Between then and now, California colleges and universities took to heart the business of teaching the visual arts; Berlant figures that the busload of his youth has grown to 10,000 working artists. Among them is a class he dismisses as "light manufacturers," as well as such established figures as Richard Diebenkorn, Sam Francis, Robert Graham and Ed Moses. Berlant lives and labors in a remodeled Santa Monica grocery store spacious enough to accommodate a mound of old tin objects waiting to be cut up for collages. If he were "rabidly ambitious" or even just ambitious, he says he would have long ago resettled in New York. But he also says of the place that has been his hometown since his sixth year, "The best is yet to come."

At times, it looks to be just around the corner. By the end of this year, the new Museum of Contemporary Art (MOCA), having survived thunderous and nearly fatal internecine conflict, will be in permanent quarters. About the same time, one of two new buildings will be opening at the Los Angeles County Museum of Art. Early in the next decade, the J. Paul Getty Trust, with its museum and six other programs, will be in a sprawl of lodgings atop a hill in West Los Angeles. The target date is 1992. Even before then the Trust, with a $2.4 billion endowment and ambitious plans for spending the income, is likely to have become the art powerhouse of America, its very presence a transforming principle, drawing scholars, students, artists and art to Southern California.

Still at the growing-pains stage

If it seems odd that the second most populous urban area in the country is only now experiencing a cultural flowering, it is useful to remember how young a place it is. The county museum, known as LACMA, is barely 21 years old. There is an old photograph of the view just beyond the museum property in Hancock Park showing two men digging for fossils, and beyond them, a forest of oil derricks. In 1914, when the picture was shot, the land bordering what would become the bustling, high-rent business district of mid-Wilshire Boulevard was a stretch of orange groves and tar pits.

Earl Powell, director, Los Angles County Museum of Art, happily oversees construction of a new building.

Photographs by Rob Lewine/Shooting Star

Marcia Weisman's collection is renowned for postwar painting and sculpture. At back, Jasper Johns' *Map*.

Left, Frank Stella's *Shards IV*. Right, Jean-Michel Basquiat's *Pakiderm*. Center, collector Eli Broad.

The film industry had begun to migrate West not many years before, and the coins collected at the world's box offices were creating the first wave of movie millionaires. With rare exceptions, Hollywood did not spend its money on important art. Even now, museum lists of big givers or of trustees—who tend to be generous donors as well as collectors—are not burdened with marquee names. The Los Angeles art scene really began taking off when other kinds of entrepreneurs decided the town was a hospitable corporate environment. It is no happenstance that LACMA's new building for 20th-century art is named for a trustee, Robert O. Anderson, executive committee chairman of Arco, whose company contributed the first $3 million toward the cost of the gallery. Or that the place with one of the richest history-of-art collections in the country, a sort of Frick of the Far West, is the Norton Simon Museum in Pasadena (SMITHSONIAN, September 1979). This is the effort of a man who made his millions in tinned tomatoes and canny investments and who dipped his toe into the art market not much more than a quarter-century ago.

Simon's art is housed in a meandering building that began life as the Pasadena Museum of Modern Art, and then fell on hard times. It was started by collectors who assumed that superior art and high enthusiasm were enough to launch an institution and assumed that support funds would automatically follow. The place went broke and in 1974 Simon picked it up at a bargain price, stored some of the choice contemporary pieces and sold off others, to the distress of artists who had donated works to the museum.

The loss of a great space where new art could be seen full-time dismayed many people, including Marcia Weisman, Norton Simon's sister. Mrs. Weisman had bought her first modern painting about the time that he was learning his way around the Old Masters, and she enjoyed a younger sibling's privilege of teasing her brother for "playing it safe" with old art. As a young wife with a new house in Fullerton, she had coaxed money for art out of an initially uninterested spouse by pretending it was a decorative necessity, something to be done for barren walls. He agreed to disburse $2,000 if it bought four pictures. In no time at all, both of them were enthralled by the pleasures of having art and knowing the people who made it. By the 1970s, the Frederick and Marcia Weisman collection of postwar painting and sculpture would be one of the best in the country, and now is on its way to becoming two of the best in the country.

In 1964, they had been planning to expand their wall space by building a new home in Bel Air designed by the influential architect Philip Johnson. On a trip West, Johnson saw Mrs. Weisman coveting a canvas she had on approval from the Castelli Gallery in New York. It was the last canvas completed by Jackson Pollack. "Look at this," Johnson said. "Wouldn't you rather have this painting than a new house?" The Bel Air place was never built.

The Weisman marriage came apart in the early 1980s; so did the collection, but in the most civilized way imaginable. While accountants monitored the event, the Weismans sat down to file-card boxes holding identical records of the price and value of every piece they owned. She won the coin toss and chose the superb Jasper Johns gray map of the United States; he took the melancholy Giacometti dog. She picked the Pollack; he selected the red Rauschenberg. And so it went, calmly, surely painfully, but without rancor, until the division was done.

"But we already have a museum"

At a dinner one night in 1979, Mrs. Weisman was seated next to the Mayor of Los Angeles, Tom Bradley. As she remembers the conversation, he asked: "What's new in the art world, Marcia?"

"Not a lot," she replied. "We can't do much here without a contemporary museum."

"But we already have a museum," he countered.

Mrs. Weisman explained at length that their city lagged far behind New York where a 30-block stretch on or just off Fifth Avenue offered five major museums.

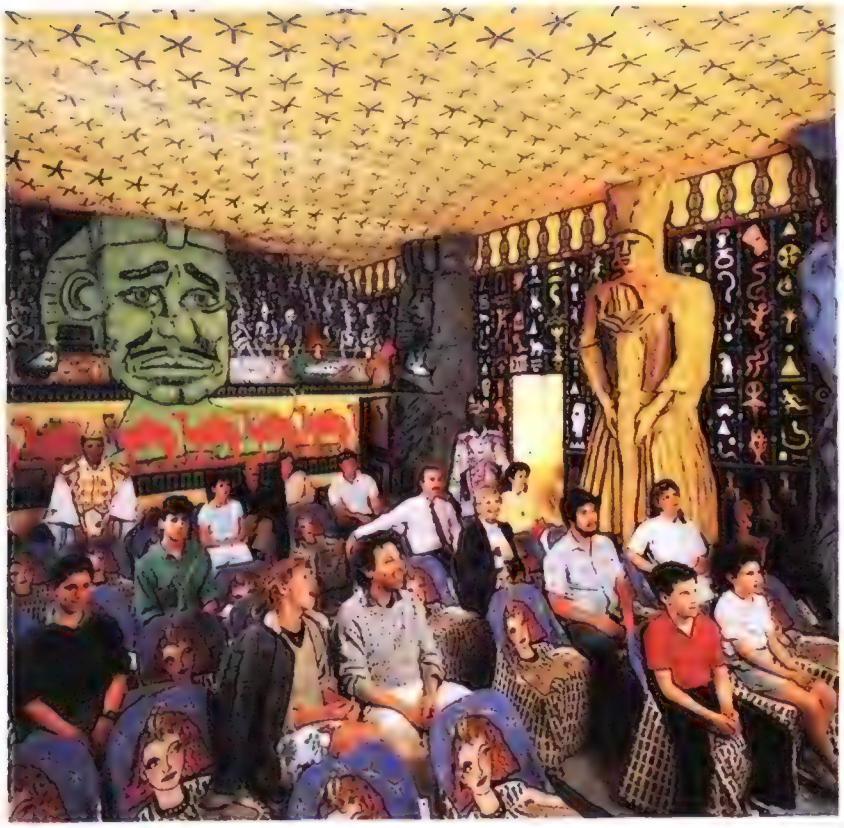
Two weeks later, Bradley called and said, "Marcia, I have an idea. What would you think of a museum of contemporary art in Los Angeles?" Thinking "These politicians!" Mrs. Weisman paused and then said the idea was wonderful. Bradley, laughing at her tact, replied that he had thought of little else since the dinner.

Thus a committee that was to form the core of a board of trustees began to meet and talk about finding a way to a new museum. It proved to be an opportune moment: the city was about to invite bids for development of an 11-acre site in the Bunker Hill area of downtown Los Angeles. For some time, Los Angeles law has required builders to give one percent of the cost of commercial development for the purchase of a piece of outdoor art. In this case, the cost of a thicket of offices, apartments and hotel, to be known as California Plaza, would eventually come to $2 billion, promising a sum—$20 million—enough to build a museum.

By mid-1980, the enterprise had a name that not only rode the fashion for cozy museum acronyms—MOCA sounds like a warming cup of coffee or a tasty bonbon—but also boldly proclaimed that the founders were looking to international status. One way to attract the East's attention was to ignore it. When the first chairman, Eli Broad, talks about choosing the board, he stresses that he "overflew New York" to recruit such prestigious names as Count Giuseppe Panza di Biumo of Italy, Dr. Peter Ludwig of Germany, Seiji Tsutsumi of Japan and Dominique de Menil of Houston and Paris.

Broad, a lean, shrewd man, is not unanimously admired by the Los Angeles art crowd. Schooled as an accountant, he borrowed money to start a business at the age of 24 and wound up with Kaufman and Broad,

Work in progress surrounds Tony Berlant in converted grocery-store home and studio in Santa Monica.



Red Grooms' *Tut's Fever* theater is at temporary Museum of Contemporary Art, called Temp Contemp.

a home-building and insurance firm with assets of $2.5 billion. Not surprisingly, he is hard-driving, accustomed to having his way and given to creating the impression that he did it all by himself. A latecomer to art, he has, with the help of a fine curator, Michele De Angelus, in the past six years built a sterling personal collection of contemporary American artists. When his house was filled up, he festooned his company quarters with a big Southern California collection that impressively avoids "safe" corporate art. He has learned to love "the discomfort of the new."

With help from a few other determined spirits, MOCA had an auspicious start. The board raised $14.5 million toward an endowment; as director, it found an international headliner, Pontus Hulten, head of the Centre Georges Pompidou, better known as Beaubourg, in Paris. Hulten's deputy was a rising American star, Richard Koshalek, who had made his mark at the Hudson River Museum in Yonkers, New York. A committee set to work on an architect hunt. When it became clear that high interest rates would require postponement of the entire Bunker Hill project, MOCA found an unused police warehouse on the edge of Little Tokyo. It also scouted up $2.5 million and enlisted the innovative West Coast architect Frank Gehry to transform the structure into the Temporary Contemporary. Fondly known as the Temp Contemp or the TC, it is now slated to be a permanent annex of MOCA.

The TC opened late in 1983 with a loan show from eight international collections including the de Menil, the Ludwig, the Charles Saatchi, the Weisman family collection and significantly, as it turned out, a sampling of 600 largely American works owned by Count

Museum of Contemporary Art director Richard Koshalek surveys section of Jonathan Borofsky show.

Panza. The show was stunning; it also drew immediate attention to a nagging problem: the museum had little in the way of a permanent collection.

But MOCA had been quietly working on a tempting offer. Panza, facing a complex array of Italian tax problems and anxious to keep sections of his collection intact, offered to sell the museum a group of 80 early Abstract Expressionist, Pop and Minimalist works (Rauschenberg, Kline, Rothko, Oldenburg). The purchase, negotiated in 1984, was relatively a bargain—and so were the final terms. Like many beginning col-

New York author Helen Dudar writes frequently for SMITHSONIAN. *Her last article, on the old Astoria film studios, appeared in November 1985.*

Bowing figure, *Gentle Giant*, was made especially for the installation. Stones represent birds' eggs.

Surrounded by Borofsky paintings and sculptures, basketball court, 20 by 40 feet, was part of show.

lectors, the museum bought the works on the installment plan: the $11 million price is payable in six years without interest.

At that point the museum had survived some fierce strife, conflicts so serious, so "nasty" that one inside figure has said they could have destroyed MOCA before it had ever hung a single work. MOCA's superstar, Pontus Hulten, arrived in December 1980 and was gone two years later, defeated by an unfamiliar system and a hive of king-size egos. Into his place went Koshalek, then 39, one of the new breed of museum people, a quick, likeable, tireless man who works in shirtsleeves, gets along brilliantly with trustees and compulsively shares credit for accomplishment.

The Hulten problem was dwarfed by the architectural problem. In a dispute over the building's design a major donor, filmmaker and industrialist Max Palevsky, wound up suing the museum for the return of half a million dollars, while the Japanese New Wave architect, Arata Isozaki, told friends that he feared he was on the verge of the second breakdown of his life. "It was chaos," says Fred Nicholas, a real estate lawyer and developer on the design committee.

In the ensuing ruckus, the trustees disbanded the architecture committee and put Nicholas in charge. The architect came back with a version of his original design, a brightly-hued assemblage of pyramid, cube and barrel vault in his witty, mannerist style.

As the public battles erupted, a kind of local art fever set in. On Sunset Boulevard, a thoroughfare once memorialized by the critic Kenneth Tynan for its "raffish squalor," owners who were converting a condominium into a luxury hotel commissioned the Israeli neo-Constructivist artist, Yaacov Agam, to dress up the banal facade. The result was a 15-story Mondrian takeoff for a hotel called Le Mondrian, commercial homage to the idea of Los Angeles as a new mecca of art.

Around that time, Broad, who buys rather slowly and only after careful study, bid a spectacular $462,000 for an early red Robert Rauschenberg. (But then an early red Rauschenberg is the sine qua non of any serious contemporary collection.) Fred Weisman moved his share of the divorce settlement into a mansion between Burt Reynolds' and Barbra Streisand's, and began adding to it on a baronial scale. His collection, which includes four de Koonings, has grown to almost 2,000 works, and he has set up a foundation for another 250 pieces that travel internationally.

A small, friendly Midwesterner who controls a tidy

The yeasty Los Angeles art scene

Seated is Duane Hanson's sculpture portrait of his father. Standing is collector Frederick Weisman.

share of the American market for Toyota cars, Weisman flies about the country in a Lockheed jet decorated with an interior daytime sky painted by Joe Goode and an exterior midnight sky by Ed Ruscha, two prominent California artists; he rarely comes home without new art and can be the working artist's delight. At a show in Newport, California, he saw a monumental George Segal bronze group called *Rush Hour*, a piece reminiscent of Rodin's *Burghers of Calais*. Weisman told Segal, who lives in the East, "George, I'll save you the freight home," and bought it on the spot. When Weisman acquired a Duane Hanson figure in New York—a typically neo-Realist rendering of a dozing old man who represented the artist's father—it seemed callous to ship it home in a crate; the art traveled to Los Angeles on a regularly scheduled airline in two first-class seats.

Like other collectors, including his former brother-in-law, Weisman has come to feel his holdings deserve an eternal resting place of their own, rather than a few rooms in someone else's museum, and last year he began negotiating to take over Greystone, a magnificent, decaying 80-room Tudor mansion set in a park off Doheny Drive. The estate, built with Doheny family oil millions in the '20s and the scene of a great murder scandal of that time, is owned by the city of Beverly Hills. Weisman has signed a lease with the city and plans to convert the mansion into a museum for his collection of painting and sculpture. The last collector with a similar idea was the late Joseph Hirshhorn, who was rejected by city elders concerned about traffic overload around a museum. The Hirshhorn Museum and Sculpture Garden is now part of the Smithsonian.

The sweet sound of jackhammers

Perhaps nothing better exemplifies the local art ferment than the Los Angeles County Museum. Sixteen years ago, a visitor touring the establishment found a William I. Pereira granite palace in dire need of museum-worthy art. It was and is Los Angeles' encyclopedic art institution, and while the collections are still spotty in some periods, many of them have grown so large they cannot be displayed for lack of space. These days, the serenity of the interiors is shattered by the sound of builders' jackhammers. In 1980, Earl A. Powell III, a robust, pink-faced art historian universally addressed as Rusty, left his job as executive curator at the National Gallery of Art in Washington, D.C., to become LACMA's director. Powell started out by making friends. He is gifted enough at this to have attracted upward of $70 million in five and a half years. Moreover, he established the kind of rapport with his trustees that allows him to view the future confidently; LACMA expects to own some big local

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Director John Walsh jr. surveys main peristyle of J. Paul Getty Museum, Malibu, which opened in 1974. Museum building in background is a re-creation of the Villa dei Papiri in Herculaneum, Italy.

collections, perhaps most important, the European Old Masters assembled by the 88-year-old oil magnate, Armand Hammer.

On his arrival, Powell inherited an $11 million scheme to enlarge the existing galleries for the permanent collection and a 50-percent cut in public funds two years previously. Nevertheless, by 1983 the new space was ready and showing good stuff hardly anyone knew that LACMA had—and Powell was immersed in plans for the next two projects: the Anderson Building and housing for an entirely unexpected windfall.

About the time that Powell moved to Los Angeles, Joe D. Price of Bartlesville, Oklahoma, was casting about for a home for a remarkable collection of Japanese scrolls and screens of the Edo period (1615-1868). Price, a manufacturer of oil and gas pipelines, was seized by Edo art 30-odd years ago when the period was given little serious thought in Japan. He owned 30 prime examples: looking for an urban setting where they would have sizable audiences, he talked to a number of museums around the country including the Metropolitan Museum of Art in New York. There is no clear explanation of how he came to settle on LACMA except for Rusty Powell's blandly modest comment that "talking it over, we became good friends and I think that was part of the equation." The gift was better than generous: with the collection came $5 million, approximately half the construction cost of the Pavilion for Japanese Art.

At the Getty, nobody has to court collectors or pamper trustees; nobody anguishes about where the next seven-figure gift is coming from. Conceivably, the heaviest burden of a $2.4 billion endowment that requires spending close to $100 million a year is assuring the envious and the fearful that you will not abuse the privilege. There are dangers, concedes Harold Williams, who runs the Trust, and they do worry him. A Californian and a former chairman of Norton Simon Inc., Williams headed the Securities and Exchange Commission in the Carter administration; service in Washington, he says, was an education in the damage possible where power is great and humility is wanting. "It's an enormous responsibility to use it [the power] well and to recognize that in some respects it is like the elephant. Anytime the elephant turns around it is liable, totally inadvertently, to knock something over."

No art institution has ever had so much potential. In 1982, six years after J. Paul Getty's death when the

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Seatbelts save lives. ©1986 Volkswagen.

Artist Yaacov Agam gave blocklike Sunset Boulevard building, converted to a hotel, a Mondrian facade-lift.

estate was settled at last, news of this pachydermal presence sent shudders through the American museum establishment; among other things, it was in a position to gobble up the dwindling world supply of Old Master treasures. But in California, as the Trust began working out its future, neighboring museums and local academia could only exult.

Not only was the Trust planning to enrich the museum, but it intended to revitalize art scholarship and art education. It has now launched a program that gathers together a flock of academic eminences for a year's exchange, initiated a massive research effort in art conservation and set out to conquer visual illiteracy at the grade school level. Although the Trust is not deeply into the business of making grants, in 1984 it also parcelled out four large, unsolicited gifts to local art institutions. What all of these activities represent, a local artist observes, is "the big honey pot."

The impedimenta and personnel for the entire enterprise will be united eventually at the crown of a 742-acre hill in the Brentwood area of West Los Angeles. There the Getty will be quartered in a $100 million complex designed by American architect Richard Meier. Meanwhile, it is scattered about Los Angeles County. The Trust offices are in a Century City glass tower. The research arm, the Getty Center for the History of Art and the Humanities, housing the library, an immense recently acquired photo archive as well as an art-history archive, plus a staff of 120, is quartered in four expensively remodeled floors of a commercial building in Santa Monica and leases two rent-controlled apartment buildings nearby for visiting scholars. The museum has been in Malibu since 1974 in a modern rendering of a Roman villa, a deliciously vulgar structure that probably echoes the original; the Romans, after all, were not hooked on understatement.

Everybody involved in the Getty is sensitive about the subject of money. Hardly anybody will discuss the price of anything and everyone rather self-righteously insists that funds to fulfill every dream are by no means limitless. One modest set of statistics, however, defines the scale on which urgent projects can be accomplished in a hurry. In 1982, when the Trust began operating, the library held about 20,000 art-related volumes. Through 1,500 dealers around the world, it has bought anywhere from one book to lifetime accumulations of specialized studies, among them the libraries of Douglas Cooper, who was the world's leading scholar of Cubist art, and Sir Nikolaus Pevsner, the British authority on architecture. Three years after buying began, according to Dr. Kurt W. Forster who directs the Study Center, the library owns 325,000 works and is on its way to a status he expects to be "the best in the country."

The museum, on the other hand, could be said to be thinking small in a big way. Right now, the collections are uneven. Mr. Getty collected well in Graeco-Roman antiquities and French decorative arts, and indifferently in European painting. The Getty Museum will avoid competing with its neighbors, says its director, John Walsh jr. It will not become encyclopedic, which is LACMA's role; except for the photographic collections, its interests will not meander far beyond the 1900s. Still, it is clear from the publicity-wary progress of its acquisitions, it will buy only the choicest examples of the periods it wants, often for awesome figures.

High finance in the art world

These sums are rarely disclosed. Anyone who follows the market knows by now that in 1984, at the London sale of 71 Old Master drawings owned by the Duke of Devonshire, the Getty bought six at a cost of about $8 million and exercised gentlemanly restraint in connection with some of the remaining items on the block. But no one has ever mentioned the cost of the famed Ludwig group of 144 illuminated manuscripts, although the view of the market was that it was probably enough to build a couple of MOCAs. One museum director has complained that the presence of the Getty in the market has elevated prices by 30 percent, which, of course, is like blaming the seller's greed on the buyer's riches.

Walsh, a courtly man who came West from Boston's

Museum of Fine Arts, is pained by the Getty's "Hearstian" image, with its suggestions of carloads of goods speeding toward Malibu as they once headed for San Simeon (SMITHSONIAN, December 1985). While offers from prospective sellers are constant, he says actual purchases are rarer than outsiders might imagine. Besides, he isn't about to stock the place as if he were staging a permanent blockbuster show where 20 fevered visitors compete for a view of every treasure. He has a distinct image of the kind of place he wants the Getty to be, and it doesn't resemble a big-city megamuseum.

Like other emigrés from the East, among them new museum keepers, Walsh finds Los Angeles high-energy territory. But the atmosphere at the Getty is peaceful, and Walsh thinks he can keep it that way, a refuge from the rat race of everyday work and worry, an oasis where a visitor can actually contemplate a great work of art instead of rushing by it or trying to remember what it cost—or wondering whether somewhere in the East there isn't a better example.

Lower gallery of the original Ahmanson Building of LACMA displays outstanding Shin'enkan collection of scrolls and screens from the Edo period. An Oklahoma connoisseur, Joe D. Price, was the donor.

By Bob Reiss

Crossing southern Australia with the 'Tea & Sugar'

Bringing water, provisions, health care and even religion, the train's weekly stop is the big event for outback towns

Inside the white, square trailer, a quarter-mile from the Australian desert town of Rawlinna, the makeshift bar was a scene of unrestrained revelry. Rock music blared. Heat throbbed. Packed into two rooms, 60 grimy men in blue or khaki workshirts shouted jokes to each other, danced, shot pool, arm wrestled and guzzled beer. They cut slabs of barbecued pork or sheep off carcasses cooling in steel pans. Camp dogs dodged boots, carrying off mouthfuls of stolen scraps. Suddenly the door opened.

"Train's here!" a bearded man called.

Thunder cracked outside from a rare desert storm. Within minutes happy volunteers had driven a flatbed truck to the train for supplies and returned. With hot tropical rain washing down tattooed chests, the men formed a brigade to pass crate after crate of Emu brand beer from the truck to the bar.

The men were railroad workers celebrating Friday night, and enthusiastic greetings had been the norm for the "Tea & Sugar" train the past three days on its lonely journey across southern Australia. Each Wednesday noon the train leaves the southern city of Port Augusta to clatter west across a vast, arid prehistoric sea of limestone, desert, blue bush and cypress. The trip to Parkeston takes three and a half days. The

Lifeline for Nullarbor Plain settlers, "Tea & Sugar" plies world's longest straight stretch of track.

Photographs by Ulrike Welsch

In Watson, fettler Robbie Matthews carries home the week's groceries, bought on the supermarket car.

train is the sole supplier of food and provisions to railroad maintenance workers living in the tiny towns—none has more than six houses—along the way.

At each stop the Tea & Sugar is met by dust-caked railroad workers (fettlers), wives, children clutching their pet puppies, rabbit shooters or gold prospectors who have come out of the desert, meteorological workers and even security guards who patrol the isolated borders of old nuclear testing grounds, keeping trespassers out. They rush up with wheelbarrows or cardboard boxes for food. They back Land Rovers or four-wheel-drive Toyotas to the siding for supplies.

In between towns, the handful of crew and social-service workers look out over a hundred kinds of nothing: miles of hard, cracked earth sprinkled with rock; arid stretches resembling the American Southwest, scrubby with dwarf acacia or dwarf eucalyptus. It's so hot there's no relief from the breeze coming through the windows, even at 45 miles an hour. Ink dries in ballpoints. The hissing of bubbling, evaporating water in an open tank car is audible during stops, while red-ocher-colored dust devils swirl in the distance, 50 feet high under the sucked-out blue of the sky. "The Nullarbor Plain is the end of the world, it's totally isolated," says Jan Brand, a family counselor with the Remote and Isolated Children's Exercise (RICE), a welfare agency whose workers ride the train.

In slightly higher elevations, the Tea & Sugar pants past flocks of Major Mitchell cockatoos, which take to the sky in fear, revealing the crimson splash of their underwings. A fox freezes on a ridge at dusk. Red kangaroos flee from the oncoming train. Parading across

Railway workers in Forrest carry precious bread and vegetables home, but they need a barrow for beer.

Like most of the towns along the line, Watson consists of a tiny station and a handful of prefabs.

a long-dead lake bed, three stately emus resemble walking bushes.

"It rains twice a year," says Brand. "It's below freezing in winter and 120 degrees in summer. There's no water. Day-to-day problems can wear you down. A haircut means a 12-hour trip to Port Augusta. A washing machine breaks down, it takes weeks to get a new part. You've forgotten to buy smokes; too bad, you have to wait a week for the Tea & Sugar." At night, when the train reaches a camp for single men, workers rush aboard, stuffing ice cream into their mouths in the supermarket car as they shop for beer, meat, vegetables and pornographic magazines.

The atmosphere does not discourage the Rev. Henry Noack, 74. "I visit all the people," he says. He rides in his own green air-conditioned car at the front of the train and has traveled on the Tea & Sugar bimonthly for 27 years. Noack calls himself a "missionary." He walks into the rowdier single men's camps on Friday nights during drunken sprees to hand out the religious tracts he writes. He waits by the supermarket car in family communities and escorts people home so that he can preach to them.

Happy-go-lucky Phil Hughes, the supermarket clerk who runs the Australian National Railways store on wheels, sees himself as a "public-relations man. I look at my job as making people happy." In his air-conditioned, single-aisle store, chubby black-haired Phil tells jokes and sells his products. The big sellers include Foster's beer, canned carrots, Hammond Innes novels, pickled onions, steaks, Spam, Bic lighters, canned orange juice, ice cream bars, insect spray and salmon spread.

For parched desert towns, the train carries fresh water in red tank cars. In boxcars and flatcars it carries gravel for rail ballast, rail ties and desert vehicles that the fettlers order. Twice a year, a department-store car brings expensive items like microwave ovens, stereos, easy chairs and refrigerators. The rest of the time railroad clerks in Port Augusta take phone or mail orders for anything from butterfish to shoes. A paymaster's car comes every other week. A green welfare car brings Jan Brand and a preschool teacher, a nurse, a librarian and last year even an artist-in-residence, who taught quilting and macramé to women along the line.

"The Tea & Sugar train is the biggest event of the week," says fettler Phillip Wyatt of Kingoonya. The train may reach that single men's camp as late as 1 A.M. "Train night is party night," says Wyatt. Jim Peacock, a crew foreman in the six-family town of Zanthus, has a more pragmatic view. "We'd be lost without the train. The nearest store is more than 90 miles away."

The Tea & Sugar train grew out of twin supply trains that carried provisions to workers constructing Australia's East-West line between 1912 and 1917. The track was built simultaneously from Kalgoorlie in the west, a gold-rush town, and Port Augusta in the east. At one time as many as 2,000 men were scattered along the route clearing brush, laying rail and digging in limestone quarries for ballast for the track.

Bob Reiss is a writer who lives in Washington, D.C. His most recent novel, Divine Assassin, *was published by Little, Brown and Company.*

Forrest housewife Daphne Smith hunts for book on the library shelves of the social service car.

One thing the kids don't look forward to: a young outbacker gets a booster shot in the RICE car.

"At the very outset," Australia's *Inlander* magazine later wrote, "two splendid hospital cars were fitted up, one for each construction camp, for wherever gangs of men work there are crushed hands, cut limbs, disorders arising from unsuitable food or water, and epidemics." Doctors and pharmacists rode the trains, but the doctors left for battlefields when World War I broke out. On October 17, 1917, the two lines were finally joined, and five days later the first Australian transcontinental rail trip began.

A theatrette car with traveling actors

In those early days the Tea & Sugar included a dental and tuberculosis clinic. A butcher slaughtered animals at each stop. When refrigeration cars came into use the animals were killed in Port Augusta but the butcher kept coming to cut meat. A theatrette car featured movies and plays by a traveling actors' group called the Magpies. During World War II the train brought provisions to Italian prisoners of war working on the line, but it left the supplies between stops, so as not to tempt the men to sneak aboard.

Today the theatrette car has been replaced by VCRs that the railroad provides. The medical cars are gone. Doctors come by air if emergencies arise. In non-emergency cases, illness or pregnancy, fettlers or wives take the train to larger towns like Cook or Tarcoola, which have hospitals. The butcher is gone. Phil brings precut meat. But despite modernization, 70 years after rolling onto the tracks the Tea & Sugar remains the lifeline of the Nullarbor Plain.

At 10 on this desert morning, pulling 26 cars with a diesel locomotive, the Tea & Sugar train approaches the town of Watson in the state of South Australia. The train's top speed of 45 miles an hour is deceptive. It was constantly shunted aside last night so that faster freight or passenger trains heading for Sydney or Perth could speed by. Literally a single line of track links east and west Australia. All trains going either way pass over the same span, and since the Tea & Sugar is a nonprofit-making train it is always the one to move aside. It can take as long as 27 hours to travel a mere 250 miles.

The train will stop in Watson for only three hours today. That means time is precious for the outback-services people. They must be ready to receive visitors the instant the train stops.

Mr. Noack is getting ready in his own brake car, which is air-conditioned and has a kitchen area and bunks for sleeping. He dons his gray dust coat and secondhand shoes for walking on the rocky ballast. He selects tracts he has written. He puts them in his satchel, which he also uses to fend off dogs. "It Happened on the Line" is what he calls his series of per-

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sonal reminiscences about the years he has spent riding the rails. The pamphlets are filled with stories of encounters with drunken men, hard men who ridicule the existence of Christ, but who occasionally show startling softness or even tears to the tenacious, scripture-quoting Noack. This week's selection begins, "I have been chatting with you on a variety of topics that hinge on your daily life, gradually leading you from the everyday world. . . ."

In their respective cars, Phil unlocks the store and a RICE team of three puts on tea, gets out toys and readies inoculation materials for youngsters. Ironically, staff members who have ridden the train for years barely know each other because their cars are not connected and all time at stops is spent working.

Watson, coming into view, announces itself with a black-and-white sign. Four fettler families live here; eight adults and three children. The railroad rents them the box-shaped prefabricated houses, which sit in a row 50 yards back from the line. No streets. No sidewalks. The towns all look the same, the homes similar in size to small 1950s American tract houses. From the outside, only the porches offer any information about the people within. Grimy dogs howl on one porch. A baby screams on another. Inside, the four large, square rooms are often decorated with posters, or animal pelts if the fettlers are hunters. Each house has a small spare room, a bathroom and laundry room, a wood and gas stove. Rent is deducted from salary, as is electricity and the cost of furniture bought on credit.

Catching up on a faster train

Sometimes the RICE ladies or the minister are shunted off at towns for daylong stays. Later they're picked up by another train and brought farther down the line. But today's visit will last only as long as the Tea & Sugar remains in Watson.

Robbie Matthews heads for the supermarket car with a cardboard box, although every other week the pay car is first stop. Matthews is a jolly young father with sideburns and tattoos up both arms. Sons Ian, nine, and Michael, six, are off from correspondence school until the train leaves. The railroad generally transfers families with school-age children to towns with schools, but the Matthews family loves the outback and prefers to stay.

Elementary-school-age children in these parts can also attend the "school of the air," based in Port Augusta—lessons by radio. They confer twice daily with teachers while other students, scattered over tens of thousands of square miles in towns and at sheep or cattle stations, listen in. On special days there are contests. During the running of the annual Melbourne Cup horse race, for instance, children are asked to

In subfreezing stockroom, train employee Phillip Hughes gathers meat and fruit pies for waiting buyers.

The Rev. Henry Noack, who has ridden the line for 27 years, offers a pamphlet to a Loongana shopper.

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dress as if they were going to the races. The youngsters describe their costumes—their little suits and white gloves—over the air. Teachers choose the winners.

"G'day! G'day!" Phil greets Robbie Matthews. He hands out letters to fettlers. He pulls credit slips. Ian and Michael make a beeline for the ice cream bin. Parents look over the shelves.

In the RICE car mothers drop off preschoolers and then leave to shop. They return for tea while the children play, cutting out papier-mâché animals or, incredible luxury, sailing toy boats in a basin filled with water. "Superlunch," announces a health poster on a wall. A poison chart details the dangers of eating mosquito coils or weed killer. In a side room Colleen Slattery inoculates children against measles and tetanus. She weighs infants and checks adults' blood pressure and glucose levels.

Over tea a mother tells Jan Brand she thinks the government should be sending larger allowances to her family. But she has no phone and doesn't know where to address a letter. Easygoing Brand tells her where to write; she also helps people get in touch with Alcoholics Anonymous or Alateen. She explains how parents can contact lawyers in child-custody fights. She listens to women who complain that their husbands drink too much or spend too much time away with the men.

"Mostly, people need to talk—they have no one to talk to," Brand says. "They talk through their problems and come to solutions themselves. Either people along the line develop a sense of community among themselves or there's trouble. It could be anything from ostracism to physical violence." Constable Graham Holloway, the lone full-time policeman for a 62,500-square-mile area, says the same thing about crime: "People generally handle smaller problems by themselves, by fighting or moving out."

Women have a harder time in the outback, fettlers

During a train stop at Hughes, Noack sermonizes fettler Bob O'Reilly and wife Margaret in their home.

Bob strategically positions himself close to the door and throws up a defense—but hangs around to listen.

Hunters like Chris Peart, a tent dweller who bags 300 rabbits a night, are also served by the Tea & Sugar.

Near Tarcoola, a "school of the air" student gussies up for fantasy visit to racetrack as part of assignment.

and RICE workers say. "The man's job at least takes him out of that square kiln of a dwelling," wrote Elspeth Huxley in 1967; "even if he has nothing to look at but red grit and dust and boulders, they are different boulders and he has his mates. But his wife is stuck day after day, week after week, in the square metal box, with a brood made fractious by heat. She cannot grow a plant, take a walk, sit under a tree. Outside the metal screens are milliards of flies, and savage dust storms that cover everything with grit. . . . What if you fall out with your neighbor? Quarrel with your husband? Day after day the same routine, the same sun heat, the same flat horizon, the same food."

Watching VCR movies with the neighbors

Robbie Matthews' wife Della disagrees. "I love it here. It's beautiful, the open air. I have a lot to do. I have a garden. I keep busy with correspondence school with the boys. The families get together for tea and watch VCR movies at night. The Tea & Sugar brings lots of movies." Della, who is Aboriginal, thinks the people here are nicer than in the city. "I never met anyone out here prejudiced," she says.

While Della spends her days at home, Robbie works out of a railroad section car, patrolling long areas of line to make sure it is safe. "Fettling" is lifting track so that it sits right. "Boxing up" is replacing ballast disturbed during lifting. "Spiking" is driving home dog spikes with a sledge. He tightens bolts and weeds ballast. An average gang, run by a boss or "ganger," consists of four men.

The fettlers say they settle here for a variety of reasons. "It's the best place for advancement on the railroads," says ganger Jim Peacock in Zanthus. "You come for two or three years, earn promotions and move. And it's a good place to get a stake. If you can't save money here, you can't anywhere."

Others love the life. Bob Mitchell is a grizzled rabbit shooter who drives his battered Toyota truck 45 miles through scrub to meet the train at Reid. He says he loves sleeping in a trailer during the day and shooting rabbits at night. With a .22 rifle he drives around the desert spotlighting the animals or catching them in headlights. He fires through the lowered front window. "I gut 'em and pair 'em and put 'em in the chiller for Perth. I might shoot 200 pair a night." Mitchell, 38, was a railroad welder for three years. He is separated from his wife and two children in Adelaide. He wears old army clothes, a stocking cap and torn jacket. "There's no bloody people out here," he says. "It's better'n the city."

A tattoo on another man's leg in Reid attests to a different reason for which men come to the Nullarbor. It reads: "Any man puts another man under lock and

key is not born from a woman's womb." "A lot of men in the 'single' camps were in prison," says Mr. Noack. "Or they just couldn't get jobs anywhere else. Those big gangs are like the French Foreign Legion." His words brought back a scene at the Friday night celebration at Rawlinna. At the height of the rowdy festivities a grimy fortyish man sat alone, hair tangled, beard matted, staring into his beer. "I can never go back to Norway," he brooded.

"Why not?"

"Never mind!"

Mr. Noack waits outside the supermarket van in Watson for people to finish shopping. He walks them home and hands out leaflets. In the supermarket car Phil jokes and takes in money. The drivers, tired from an eight-hour shift, shuffle back through the 95-degree heat to their own car. Two teams of two drivers switch off regularly during the journey, as do two guards. Midway to Kalgoorlie, at the Western Australia border, crews from that state take over the train.

But the three-hour stop is finished. The last shopper lingers at Phil's counter. The feeling of activity brought on by the train is dissipating. Water supplies have been unloaded, freight cars disconnected. The guard pokes his head in to ask Phil, "You right to move?" "Yeah, mate, yeah," Phil answers.

A single track links Port Augusta with Kalgoorlie; Tea & Sugar must wait on sidings for other trains to pass.

Loongana's mysterious mouse invasion

By the time the train pulls out, the Land Rovers are leaving. People have shut the doors to their homes. Heat beats down on Watson. Without the Tea & Sugar sitting opposite the houses, forming the far boundary of a dusty makeshift street, the desert laps right up to the doors. A dog barks. A child is crying. Year after year.

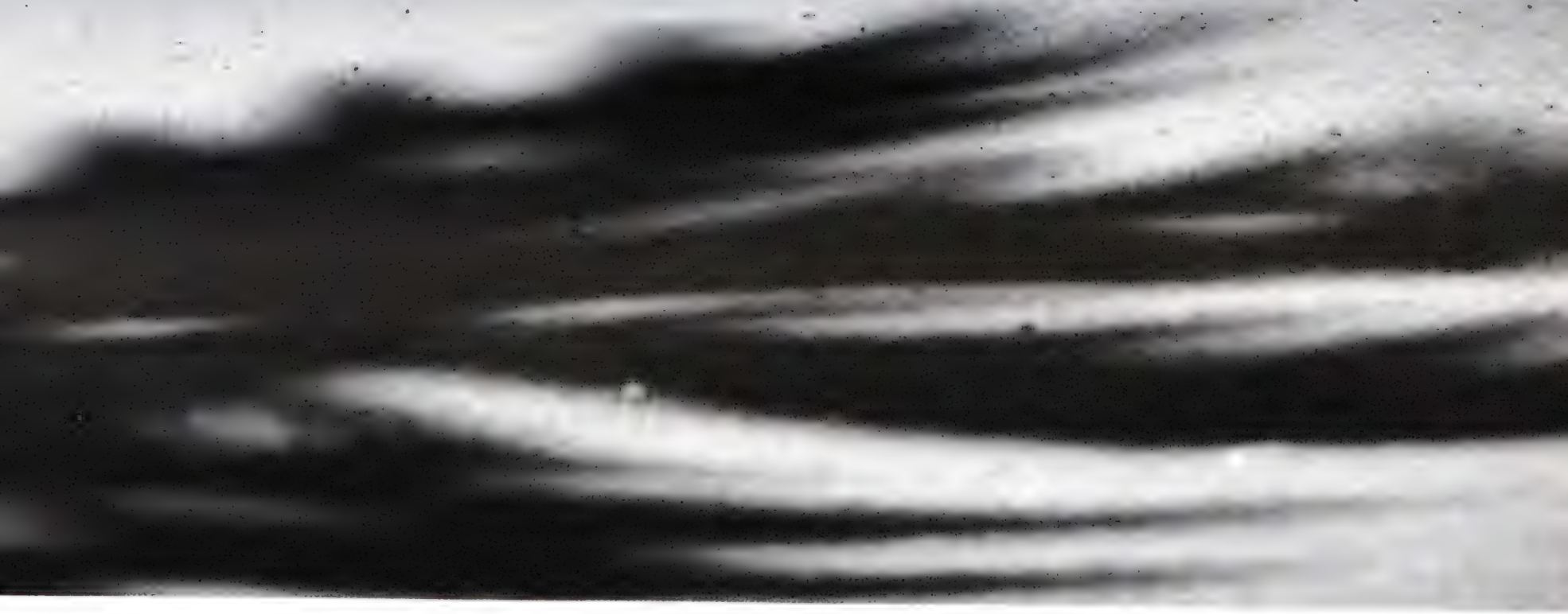
Heading for Loongana on the "long straight" (at 299 miles it is the longest stretch of straight track in the world), driver George Johnston is telling stories about animal invasions and insect swarms. Back in 1931 an army of mice invaded Loongana. The stationmaster sent an SOS by wire: "Rest is impossible. Everywhere one looks are thousands of animals which seem to have come out of the sky. They are eating everything . . . attacking furniture and bedding." As mysteriously as the mice had appeared, they were gone.

"Last year we were right about here when I saw a brown cloud ahead. Thought it was a storm. Then the locusts started hitting the windshield. We closed the windows. One-hundred-thirty kilometers [80 miles] of locusts."

Likewise, at the turn of the century, the Western Australia government sent Arthur Mason to investigate reports of a rabbit army advancing out of the south. He never found the rabbits but he was almost done in by the blowholes. Blowholes are cavities in the earth, sometimes so huge that trees can grow inside, sometimes as small as a foot in diameter. They spew forth frosty cold air, which comes through underground limestone shafts and caverns from the ocean, more than 60 miles away.

"Many blow outwards and others suck inwards," Mason wrote. A number of them roared at full blast. "In some the sound was like rushing water; in others like a train at full speed, and again like the noise of an approaching hurricane." At night the holes were hidden by grass, and several times Mason's party nearly fell down them.

Anywhere along the Tea & Sugar line, ask for stories and grisly ones pour out; often, the message is "Don't walk long distances out here." It's hot and it will kill



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you. Johnston says, "There was the stationmaster's wife who wandered away, into the outback. She'd lived in the city and used to do it there. When she did it here they found her mummified under a tree, months later."

Stories emphasize the power of the outback, and the danger and isolation. There are legends of drunken trainmen who took section cars into town at night without permission, only to meet death from oncoming trains. Fires can consume houses in minutes. Currently the police are investigating three recent fires along the line.

But funny stories abound, too. Paul Miller was a fettler in Zanthus engaged to be married. On his wedding day a big fight erupted in camp. Miller, the bride and Mr. Noack hopped the Tea & Sugar and the ceremony was finally performed in Kalgoorlie, 125 miles away, long after the guests went home.

Inevitably, storytellers get around to who-got-left-behind-by-the-train. Drivers, supermarket clerks, the minister, the guards—all have been victims. In fact, later that night one of the storytelling off-duty drivers is still drinking beer in Rawlinna when the train pulls out ahead of schedule. The driver catches up with the Tea & Sugar at 2 A.M., sheepish, having jumped aboard a fast freight.

As with many other famous trains of the world, the future of the Tea & Sugar is in jeopardy. In recent years, Australian National Railways has begun modernizing the line, replacing the old wooden sleepers (ties) with more durable concrete varieties, and welding longer lengths of track, which need less maintenance. Fewer workers are necessary. The big single gangs, whose job is to replace the sleepers, will be gone in an estimated four years when the job is done.

Signs of the future are visible all along the line: a row of empty prefabs, or a six-house town where only two homes are occupied. A sign that says "Mt. Christie," once a town, now a footnote on a map tourists get on the fast passenger trains: "Mt. Christie is in the range of hills about 30 kilometers [19 miles] north of the rail line." Mt. Christie, once a home for fettlers, has become an arbitrary point in the desert, a black-and-white announcement marking nothing more than a pile of discarded wooden sleepers. They once supported the Tea & Sugar; now they are destined to be burned in suburban fireplaces.

Or Loongana, once a thriving town where workers dug in the big limestone gravel pit, acquiring ballast for the track. The pit is closed. At midday at the bottom of the pit there is silence instead of the sound of heavy machinery. Shell and crustacean fossils are visible in the rock. Scattered carcasses of kangaroos that were shot for sport litter the ground, half buried. The only interruption of utter silence is the soft, whispery "shhhhh" from a tiny blowhole spewing icy cold air into the otherwise 120-degree heat. In Karonie, where the Tea & Sugar makes its last stop before the Parkeston rail yards and end of the trip, the last two fettlers say they are getting ready to move, the town is closing.

"There are no plans to shut down the Tea & Sugar train, but it has been discussed," says a spokesman for

Loaded with supplies from Tea & Sugar to last them another week, fettler family in Hughes heads home.

Australian National Railways. "Remember, the railroad runs for profit." On the Central Australian Railroad from Adelaide to Alice Springs, there is no Tea & Sugar-type train. Fettlers live in larger towns and place orders for special needs from Port Augusta.

If that happens on the east-west run, the Tea & Sugar will lapse into legend—although who knows? Perhaps on foggy desert nights, or during rainstorms or mere fits of imagination, the first-class passengers on the elegant Indian-Pacific between Sydney and Perth will look out of their air-conditioned sleeping compartments, or their piano lounge, and suddenly smell the old kerosene lamps and refrigerators from the old trains, and see what the drivers saw on Tea & Sugar stops: the hundred-man work camps on Friday nights, lit by bonfires and booze, the parties that went on for days, the grime on the miners and rabbit shooters, the engineers running after departing trains. The scorpions. The foxes. The beautiful flowers after a rain.

But then the fog might clear, or the piano start up behind them, and their vision will correct itself, and what will remain will be that which has been there all along—the vast, implacable prehistoric sea called the Nullarbor Plain.

Père David's deer raised in captivity eye intruder at Woburn Abbey, Duke of Bedford's estate in England.

By Nigel Sitwell

Back home at last, China's *milu* get a new lease on life

Nearly a century after the last native Père David's deer were killed off, the species has been reintroduced to its Chinese habitat

Animals transported to China for reintroduction were from the Woburn herd, which numbers about 600.

On a nippy afternoon last November, 200 people gathered expectantly near a bamboo-walled quarantine hut in a field 14 miles south of Beijing, the capital of the People's Republic of China. Many in the group were farmers from nearby Nan Yuan, a former agricultural commune that employs 30,000 workers. There were also several leading Chinese scientists and a VIP group headed by Zhang Jianmin, Vice Mayor of Beijing. Chief among the few Westerners present was an English aristocrat, the Marquess of Tavistock, son of the 13th Duke of Bedford.

A chill wind blew across the North China plain, but the sun was shining and it illuminated the brownish hues of early winter with a golden glow that reflected the onlookers' mood of keen anticipation. For this was a long-awaited and very special occasion—the return of a legendary native species more than 85 years after its disappearance from the Chinese mainland. The animals, known in China as *milu* and to Westerners as Père David's deer, had been donated by Lord Tavistock from the large captive herd that is privately maintained at Woburn Abbey, seat of the Dukes of Bedford for four centuries.

Turning them loose in their new home

Finally, all was ready and the doors of the quarantine hut were pulled open. At first nothing happened. Then a head peered out. The animal took a few hesitant steps, looked around with a puzzled air and headed off past the row of spectators. Soon others followed, singly and in small groups. Some raced away at top speed while others seemed disoriented at first, not knowing where to go. One even turned back into the hut before being shooed out again. Within three or four minutes, all 22 of the deer had safely left the hut and disappeared in the direction of a large shallow lake in the center of the park.

It was an emotional homecoming for those watching. "I feel very excited and touched," admitted the tall, impeccably tailored Lord Tavistock. "Returning a herd of these deer to their homeland is something I have wanted to do ever since my grandfather first showed them to me when I was about 13 and told me their story." Qu Geping, the director of China's National Environmental Protection Agency, praised Lord Tavistock's generosity: "It symbolizes his dedication to wildlife protection and also his sincere friendship for the Chinese people."

Père David's deer is a large animal, falling in size about midway between the wapiti, or American elk, and the mule deer. A mature male weighs nearly 500 pounds and stands four feet at the shoulders. In summer, the animal is reddish brown in color, turning to grayish brown in winter. The species was completely unknown outside China until 1865, when its existence was revealed by a French Lazarist missionary, Père Armand David. During his 12 years in China, the young priest earned far greater fame as a naturalist than as a saver of souls. He discovered 58 birds, about 100 insects and a number of mammals, including the giant panda.

Père David was very curious to find out what animals lived in the vast Imperial Hunting Park, a 144-square-mile royal preserve located a few miles from central Peking, as Beijing was then called. The main problem was that the whole park was surrounded by a

Photographs by Michael Freeman

Xinhua

Flown to China from England in sturdy crates, deer arrive at Beijing airport on a rainy summer day.

brick wall ten feet high. Then one day the missionary noticed a large heap of sand that had been left by some workmen. Scrambling up the sand and looking over the wall, he saw in the distance "a herd of more than 100 of these animals, which looked to me like elks. Unfortunately they had no antlers at this time."

Père David wanted to obtain skins of the unusual creatures for scientific examination. After several fruitless attempts through the French legation, he resorted to underhanded means. "Luckily I knew some Tartar soldiers who are going to do guard duty in this park," he wrote to Professor Henri Milne-Edwards, who at that time was the director of the Museum of Natural History in Paris, "and I am sure that by means of a bribe I shall get hold of a few skins, which I shall hasten to send to you."

And so he did. A midnight rendezvous was arranged, and the skins and bones of a male and female were passed over the wall in exchange for 20 silver pieces. The specimens were soon on their way to France. Once the secret was out, strangely enough, the Chinese authorities subsequently complied with requests for live deer and a number were acquired by European zoos.

It appears that the species was almost certainly extinct in the wild when the missionary "discovered" it, and probably had been for 1,400 years. One difficulty in checking past records stems from one of the Chinese names for the animal, *sibuxiang*. This means "four unlikes," and refers to the antlers of a deer, the tail of a donkey, the neck of a camel and the hooves of an ox. This same name was given to some other odd-looking creatures, such as the reindeer and the camel, creating an impression that the deer was more widespread than it really was. The currently preferred Chinese name, *milu*, means a deer that lives in swampy places.

It was certainly living wild in the third century A.D., when a herd of 1,500 was recorded as stampeding through a military camp in north China. In the 18th century the Qing Emperor Qian Long was impressed as a child by a magnificent set of antlers, one of his grandfather's trophies, in the palace armory. Later in life he tried to find the deer and discovered that the species still existed in his own backyard, in the Imperial Hunting Park.

In Chinese legend, great events are sometimes foretold by the appearance of a pure white Père David's deer, and the animals are harnessed to the heavenly chariots of some Chinese gods. It is said that pregnant women who look at the deer risk giving birth to four-eyed children. Supposedly, the velvet antler is used as a general blood tonic in Asia, but old medical texts warned that eating too much of the deer's flesh might cause impotence.

The Chinese nobility considered the deer second only to the bear as an animal worthy of hunting, which no doubt explains why it lingered on in deer parks long after it had ceased to exist in the wild. Two events caused its final disappearance. In 1894 the walls of the Imperial Hunting Park were breached by a severe flood and many of the deer escaped into the surrounding countryside, where they were killed by the starving peasants. Six years later, foreign troops shot the remainder during the bloody Boxer Rebellion (SMITHSONIAN, May 1985).

At that point, Herbrand, the 11th Duke of Bedford and Lord Tavistock's great-grandfather, appeared on

Xinhua

Deer donor Lord Tavistock (second from right) watches release from quarantine pen with Chinese officials.

the scene. He was said to be a lonely man who spoke little, even to his own wife. But he was a keen naturalist and became a Fellow of the Zoological Society of London at the age of 14, later serving as its president for 33 years. The Duke realized that the captive Père David's deer in Europe were now the sole survivors of the species and he reckoned that they would be better off if allowed the freedom of a large park, rather than being confined in small groups in city zoos. So he acquired all 18 of the deer and released them among 3,000 rolling acres of wooded grassland at Woburn, safeguarded by a 13-mile wall.

The deer thrived in their new home and continued to do so under the care of Herbrand's son, Hastings. The 12th Duke was somewhat eccentric. He kept five large aviaries in the dining room at Woburn Abbey and mice used to run about eating seeds beneath the cages. He also kept a large can of mealworms on a side table from which he fed a pet owl.

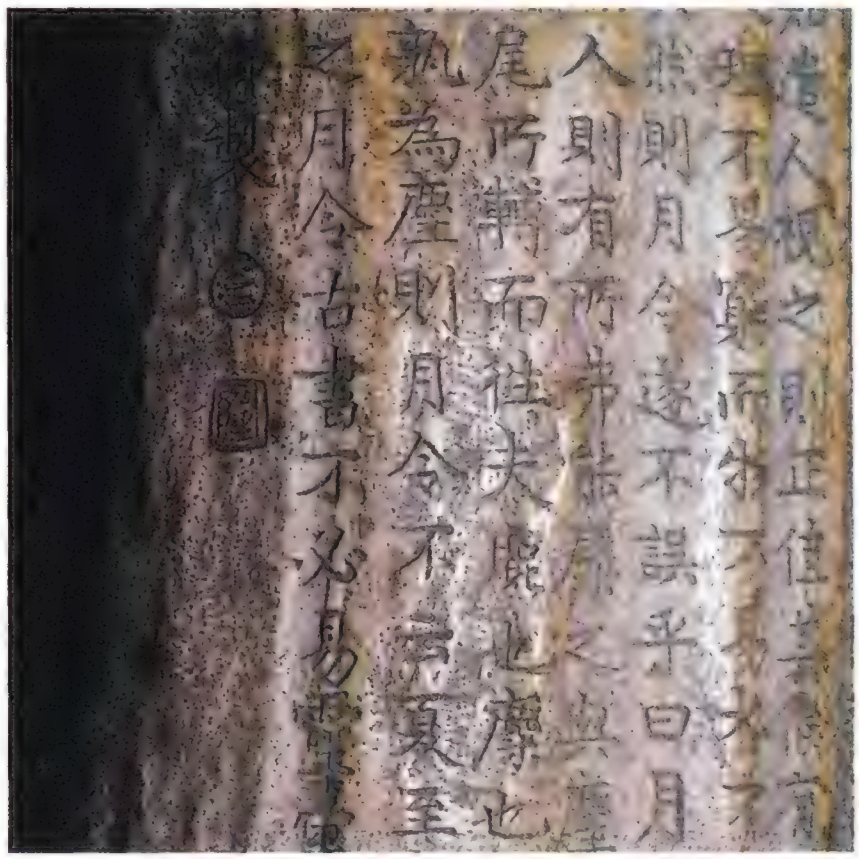
In due course Woburn and its deer passed to the 13th Duke, who later transferred the estate to his son, Lord Tavistock. Over the years groups of the deer have been sent to zoos around the world, and the total population now stands at more than 1,500. The 600-plus at Woburn still constitute by far the largest herd and the only one that is free-ranging.

Sharing the peaceful Woburn parkland are eight other deer species. The Père David's deer have pride of place, however, and with such a flourishing herd Lord Tavistock responded positively to tentative Chinese inquiries in 1980 about the possibility of reintroducing the species. This was followed by several years of discussions, mainly involving the investigation of possible sites for the reintroduction combined with detailed ecological and behavioral studies. Bearing the brunt of these negotiations was a longtime friend of Lord Tavistock's, Maja Boyd, 41, an American zoologist who is currently a graduate student at Oxford University. She has been studying Père David's deer for a postgraduate degree since 1979.

The project received China's final seal of approval one memorable afternoon when Maja Boyd was bidden to the Great Hall of the People for a personal audience with Vice Premier Li Peng, who is generally considered to be the likely successor of Premier Deng Xiaoping. The cordial meeting was followed by news that the project would have financial backing from the State Council, the Chinese equivalent of the U.S. Cabinet. More than $550,000 was granted during 1985, with an additional amount to follow this year. Substantial support has also been provided by several

Free-lance writer Nigel Sitwell was formerly the editor of a British wildlife magazine. His article on pearls appeared in January 1985.

Inside a holding pen, worker at deer park feeds one of transplanted animals. Ear tag is for identification.



Text inscribed on horn at Natural History Museum of China tells about Père David deer's antler cycle.

Lord Tavistock, whose great-grandfather started herd, leafs through records in Chinese Room at Woburn.

corporations, most notably Shell Oil (China) Ltd. and Connecticut-based Lindblad Travel Inc.

The site chosen for reintroduction is part of the Nan Yuan Farm and occupies what was formerly the southwestern part of the Imperial Hunting Park. The farmers willingly agreed to hand over 250 acres for the deer's new home, and this is now called the Beijing Nan Haizi Milu Park (*Nan Haizi* means Southern Lake, after the shallow lake that occupies part of the area). The park is to be doubled in size this year.

Once the final go-ahead was given for the project, workers at the farm moved fast to plant grass and remove part of a tree nursery. Wells were dug and electricity was installed. It took 600 people just 100 days to build a wall more than two miles long and eight feet high around the outside of the park. Meanwhile, across the world in the English countryside, the deer were being captured at Woburn Abbey. After a month in quarantine, the animals were shipped by air to Beijing and loaded onto trucks for the final leg of their journey to Nan Haizi.

The Chinese people had been well prepared by widespread publicity for the reintroduction. As a result, interest in the homecoming was at a fever pitch by the time the deer arrived. Establishment of a nongovernmental Milu Foundation to raise funds for the protection and study of the deer brought a quick response, and within a few weeks nearly $16,000 had been raised. Children were especially keen, and the first donation of all came from a seven-year-old named Lu Bing, who gave her savings from three years' pocket money. Nicknamed Lulu (*lu* means deer), she had asked that the money be spent on some chocolate for the animals. It will probably be used for more mundane purposes.

One of the aims of the Nan Haizi project is to build up the size of the herd so as to have animals available for release in other suitable areas of the country. In the meantime, the project has already produced some significant spin-offs. Birds are appearing within the park that were not there before. And soon after the deer's release, the Mayor of Beijing let it be known that he would like to see Nan Haizi enlarged by the addition of more than 12,000 acres. The objective is not just to benefit the deer but to encourage the conservation of nature in general. Thus, what began as a unique attempt to return Père David's deer to their homeland may yet turn out to be a catalyst for increasing awareness throughout China of the need to safeguard the good earth and all of its wild creatures.

The gregarious deer huddle in a sunny field where their ancestors may have congregated a long time ago.

By Stephen S. Hall

Tesla: a scientific saint, wizard or carnival sideman?

History has not been kind to the showy inventor of alternating-current motors and more, but the tide is at last turning

The laboratory, infamous among neighbors, was located on the fourth floor of a building on south Fifth Avenue, just above Bleecker Street. Strange glows and flashes of blue lightning emanated from it in the middle of the night. In Victorian New York, these were silent, eerie announcements that the age of electricity would soon similarly glow and flash all across America.

Nikola Tesla would usually show up after dinner, around 10 o'clock, and work through until morning. When journalists or friends like Mark Twain dropped by, Tesla would amuse them with electrical tricks. For his pièce de résistance, the tall, immaculately dressed host would leap onto an electrified platform. Ever the picture of erect charm and courtesy, he remained motionless as the voltage steadily rose; soon, two million volts of electricity were coursing over his body. The electricity created an interesting effect: a kind of electrical halo surrounded Tesla as he stood there, unmoving, an object of astonishment and envy, alone in his private universe of electrons and light.

Whether Tesla is the patron saint of modern electricity or some carnival sideman in the history of science is an issue that prompts a good deal of heated disagreement even now, 130 years after his birth. In Yugoslavia he is a national hero. To boosters in the International Tesla Society he is the unacknowledged inspiration for everything from radio to robots to radar. A devoted group of disciples in California is convinced that at his death he was whisked back to Venus, from whence he first came. Among contemporary academics and historians of science one hears more modest assessments of his talents, as well as occasional muttered use of the word "crackpot." Variously described as a "gifted madman" and as "a medieval practitioner of black arts," Tesla remains in death as in life a lightning rod for all manner of praise, criticism, controversy and exaggeration.

His brain, wrote one admirer, was to the intelligence of other inventors "as the dome of Saint Peter's to pepper-pots." Hardly anyone disputes that Tesla possessed a brilliant intellect, and a good thing, too, for his personal idiosyncracies would have thoroughly undermined the credibility of a lesser talent. The same man who compulsively computed the cubic contents of every meal set before him made alternating current practical for mass use. The neurotic who reacted with phobic horror to pearl earrings on women was one of the pioneers of wireless transmission—what we call radio. The visionary who foresaw plasma physics and the cyclotron had a deathly fear of germs. The eccentric who insisted on having exactly 18 napkins with which he polished the silver and glassware before every dinner, and who tried to stay in hotel rooms whose numbers were divisible by three, received patents for robots and remote-control devices before the turn of the century. Millions scoffed when, almost five decades ago, he spoke of death rays and an electronic "Chinese wall" of defense around America created out of radio waves; now, billions of dollars are being spent on the conceptually similar "Star Wars" defense.

A dizzying array of devices

Tesla admirers attribute to him the origins and application of a dizzying array of devices: fluorescent lights, x rays, the electron microscope, microwave transmission, satellite communications, solar energy, guided missiles, computers, the automobile speedometer, television, vertical-takeoff aircraft and radar. A symposium to be held this summer in Colorado Springs, jointly sponsored by the International Tesla Society and the local section of the Institute of Electrical and Electronics Engineers, attests to the interest Tesla still generates among scholars.

William Terbo, honorary chairman of the Tesla Memorial Society and the inventor's grandnephew, is gratified, of course, but sighs at the lack of credit. "When you're a little ahead of your time, you can be proven right in your lifetime. When you're way ahead of your time, the cause and effect may not be so evident."

As showman in 1894, Tesla astonished crowds with his cordless, phosphor-coated bulb lit by radio waves.

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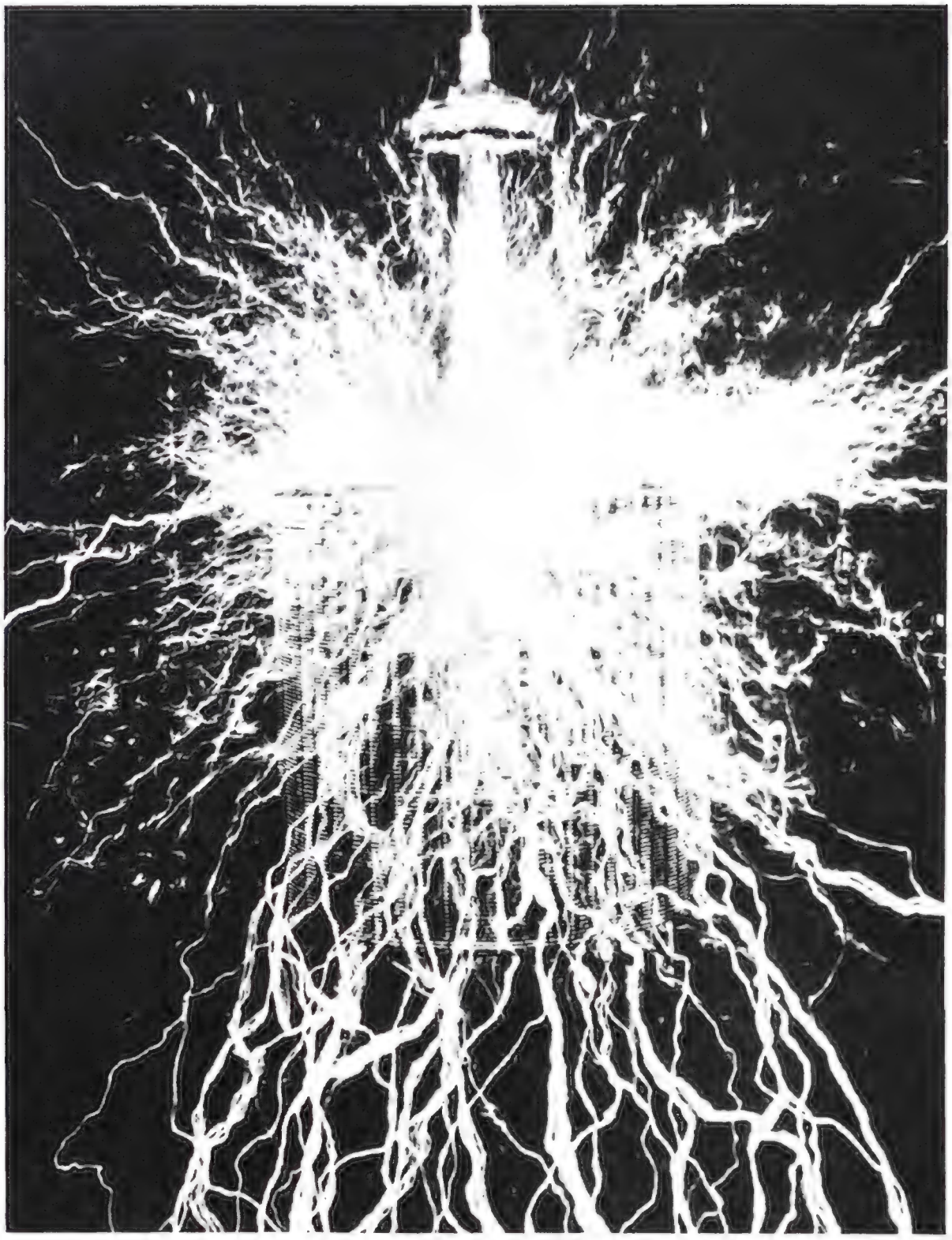

In 1900 world's largest Tesla coil, 52 feet in diameter, created ganglia of light during 12-million-volt discharge.

Tall, stylish, with smoldering blue eyes and a fine mustache, aloof yet full of charm, Tesla was a master of electricity when electricity transformed American life, a peer and rival of Thomas Alva Edison. Indeed, rarely has the combination of personal grandiosity and technical genius produced such spectacular results. At the height of his powers, Tesla created an earthquake that made a Manhattan building rumble, lightning that rolled across the plains of Colorado and, in a regrettable excursion into man-made pomposity, threats of planetary omnipotence. With his oscillating vibrator, he boasted, he could split the Earth "as a boy would split an apple—and forever end the career of Man."

He arrived in New York City in 1884 with four cents and a few of his own poems in his pocket. Within 20 years his adopted homeland would begin to be wired with a system using alternating current, which evolved from

Stephen Hall wrote about inventors for SMITHSONIAN *in August 1984.*

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an idea he had brought from Europe to America.

Tesla was born at midnight between July 9 and 10, 1856, in the Croation village of Smiljan. His father was a clergyman, his mother a strong inventive woman with a prodigious memory. Accounts of his childhood (of which Tesla himself was the primary source) are more inspirationally than factually satisfying. As a youngster, he invented his own waterwheels and motors driven by June bugs; he also took apart watches. By the time he was a teenager, he spoke four languages. As an 11-year-old, one story goes, he would stay up all night reading by candlelight; this being the boy-inventor nonpareil, he of course made the candles himself.

One of Tesla's particular gifts was mathematics. His genius in the subject reportedly stemmed from a more controversial "talent": the ability to experience visions. Tesla's biographers report that he was able to visualize a blackboard and compute upon it, thus performing complicated mathematical calculations almost as soon as they were recited.

As brilliant as the young Tesla was, so too was he chronically infirm and bedridden. An ill-conceived childhood invention (refined some years later by the Wright brothers) had Tesla hyperventilating on a barn roof to lighten himself, and then leaping into the air with an umbrella; the convalescence was long and painful. In his teenage years, he contracted malaria, cholera and unspecified nervous disorders that brought him to the verge of death and may have contributed to his germ phobia.

Soon he was off to Graz, Austria, to study electrical engineering; he later attended the University of Prague. In 1881 he found himself employed by the new Central Telegraph Office in Budapest. Working 19 hours a day, sleeping only two (a pattern he allegedly maintained for the rest of his life), Tesla suffered what we would now call a nervous breakdown.

While recovering, he had a vision that led to the most widely applied of all his ideas: the rotating magnetic field and the alternating-current induction motor. It had all the elements of high drama.

Tesla was strolling through a city park with a friend at the time. The sun was setting. Lines from Goethe's *Faust*, committed to memory years earlier, came to mind and Tesla recited: "Ah, that no wing can lift me

Thomas Alva Edison, shown with phonograph, first employed Tesla, later tried to block the use of his alternating current.

In 1909 Guglielmo Marconi shared a Nobel Prize for contributions to "wireless," but Tesla had also transmitted wireless signals.

from the soil/ Upon its track to follow, follow soaring!" Suddenly the idea hit him "like a flash of lightning and in an instant the truth was revealed." While his friend worried that the sickly Tesla had been seized by a fit, Tesla grabbed a stick and quickly diagrammed the wiring of an electrical motor in the dust. This drawing represented the rotating magnetic fields of an alternating-current motor.

Tesla realized that by surrounding the armature and drive shaft of a motor with several wire-taped blocks, or field windings, one could electrically feed each winding with alternating current slightly out of phase with the others. By precisely timing these "polyphase" currents, in fact, a north-south magnetic field could be made to circle around the drive shaft and induce it to follow magnetically. Goethe's "follow, follow," it has been suggested, put him in mind of a rotating magnetic field and the armature following it.

What he had hit upon was a successful solution to problems (such as sparking) inherent in early direct-current motors. His concept—the possibility of using alternating current—without exaggeration revolutionized the use of electricity.

Alternating current was his entrée to the front ranks of electrical engineering. The Continental Edison Company, based in Paris, hired the 26-year-old Tesla as a troubleshooter. Although no one expressed much interest in his AC motor design, one of his bosses, Charles Batchelor, who had worked with Thomas A. Edison, sent Tesla off to New York with one of the pithiest and most prophetic letters of introduction ever penned. Wrote Batchelor to Edison: "I know two great men and you are one of them; the other is this young man." America's reigning inventive genius hired him on the spot.

They were two extremely bright, willful and egocentric men, destined to clash. Tesla lasted less than a year in Edison's Manhattan workshop, but the rivalry went on for a lifetime. The two inventors parted company in 1885 on less than felicitous terms. Tesla claimed Edison had reneged on a promise to pay him $50,000 after he had designed a complete line of new dynamos and that Edison lamely explained away the dispute by saying, "You are still a Parisian. When you become a full-fledged American, you will appreciate an American joke."

The hostilities assumed gigantic

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proportions when Tesla's AC system came to the attention of George Westinghouse, the inventor whose growing industrial empire was based in Pittsburgh. Westinghouse immediately saw the practical advantages offered by Tesla's AC motors and an alliance was forged with the newly formed Tesla Electric Company in 1888. What was at stake was nothing less than the power system which would drive America's booming industrial sector, feed its subways, power its streetlights, and light homes in every state in the Union.

This was the ultimate power struggle, the War of the Currents: Edison's DC versus Tesla's AC. Direct current could be delivered economically only within a few miles' radius of its source. A national power grid of Edisonian stamp would have littered the land with nearly as many power stations as fire hydrants.

Tesla's polyphase system, by contrast, allowed power to be transmitted hundreds of miles because alternating current could be economically transmitted at high voltages, then reduced, via transformers, to lower voltages for household use. The economic stakes were enormous. For the rights to use his patents, Westinghouse was willing to pay Tesla $70,000 in cash and notes, plus a fabulous royalty of $2.50 per each horsepower produced.

George Westinghouse backed Tesla in the struggle over alternating current.

The propaganda that flew back and forth had the voltage of a religious schism. According to historian Thomas Hughes, Edison's campaign to discredit AC reflected "one private enterprise's endeavor, through political power and legislation, to outlaw the technological advantage of another." Edison and his allies had huge capital investments tied up in direct current, so they argued that alternating current was dangerous and potentially fatal to consumers. Edison forces even conspired to place a Westinghouse AC generator in New York's Auburn State Prison to power its electric chair; after the first prisoner was electrocuted in 1890, they gleefully campaigned against "the executioner's current."

But Westinghouse proved a formidable ally for Tesla. His engineers modified the Tesla system for practical use, and bit by bit it gained adherents. Edison's outrageous slanders notwithstanding, AC was perfectly safe, if properly handled, and finally made long-distance transmission of power economically feasible. In 1892, Westinghouse underbid Edison and won the right to provide the power system to light the 1893 World's Columbian Exposition in Chicago. Adoption of alternating current for the 1896 Niagara Falls hydroelectric project (p. 128), first of its kind in the country, signaled America's inevitable conversion to the Tesla system.

Yet Tesla's victory had a bittersweet economic outcome. Early on, when the issue was still in doubt and the Westinghouse Company found itself in severe financial difficulty, George Westinghouse faced intense pressure from bankers to revoke the lucrative royalty agreement with Tesla. Tesla, never especially shrewd in financial matters, agreed to accept a $216,000 cash settlement. It was a tragic miscalculation, for at the stroke of a pen he surrendered a fortune—estimated as high as $12 million in only four years. After one decade of glory, his scientific work would forever suffer for lack of cash.

J. P. Morgan's daughter Anne loved Tesla, but wore pearls, which he abominated.

Poverty was hardly a concern to Tesla in the 1890s. He had become such a celebrity that at the 1893 Fair he starred in his own exhibition. He cut a dashing figure as he strode onstage in white tie and tails. Before a gasping crowd, he calmly stood in his cork-bottomed shoes as several hundred thousand volts of electricity from a nearby Tesla coil coursed over his body. He would pick up light bulbs or long glass tubes. Unconnected to any wire or any source of power, the bulbs bloomed with light in his hand, the glass tubes flared into luminous swords. Sometimes he even struck a Statue of Liberty pose to heighten the effect.

He lived at the Waldorf-Astoria and had a regular table at Delmonico's. Even his love life—or, more accurately, his resolute bachelorhood—became the subject of comment. The *Electrical Review* observed in 1896, "We are certain that science in general, and Mr. Tesla in particular, will be all the richer when he gets married." Tesla, the celibate loner, revealed his own views around 1897 when asked if he believed in marriage for people of "artistic temperament."

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"For an artist, yes; for a musician, yes; for a writer, yes; but for an inventor, no," he replied. "The first three must gain inspiration from a woman's influence and be led by their love to finer achievement, but . . . I do not think you can name many great inventions that have been made by married men. It's a pity, too, for sometimes we feel so lonely."

His strange phobias were never cited, of course. Anne Morgan, the handsome daughter of financier J. Pierpont Morgan, reportedly fell in love with Tesla; she made the unforgivable mistake, however, of wearing pearl earrings at their first meeting.

If your definition of radio is the wireless communication of signals from a transmitter to a receiver, then Tesla demonstrated something very much like this in 1893. Not only did he propose the technical means of transmitting signals with special high-frequency transformers he'd invented in 1890 known as "Tesla coils"; he later had the vision to predict their ultimate application. "A cheap and simple receiving device," he wrote in 1904, "which might be carried in one's pocket may then be set up anywhere on sea or land, and it will record the world's news or such special messages as may be intended for it."

Tesla's concept of "wireless intelligence" was, as usual, part of a larger technical cosmology. He believed either radio signals or pure electrical power could be transmitted by electromagnetic vibrations throughout Earth. He devoted two years to a variety of experiments until his work was tragically interrupted in March 1895. The building housing his laboratory burned to the ground. Tesla lost everything—machinery, equipment, papers, mementos.

It took months to find a new lab, on East Houston Street, and another two years to get it outfitted. This delay may be considered something like a gestation period for one of science's great controversies. Later in 1895 Guglielmo Marconi (SMITHSONIAN, March 1982) first demonstrated the wireless transmission of signals in Italy. In June 1897 Tesla had accomplished much the same thing: he had broadcast signals from his Houston Street laboratory to a boat 20 miles up the Hudson River. Patents were filed by Tesla the following September.

Fan, built in 1892, ran on Tesla's alternating-current induction motor.

First great application of Tesla's alternating-current system was with 5,000-horsepower generators of Niagara Falls Power Company.

It is Marconi and not Tesla, of course, who is generally accorded the honor of having invented the radio, although Tesla sarcastically remarked on the very day in 1901 that Marconi sent his famous "S" signal across the Atlantic, "Let him continue. He is using 17 of my patents." Tesla devotees argue that, beginning with the invention of the Tesla coil in 1890 and culminating with the 1893 lectures, Tesla had briefly outlined basic principles of wireless transmission. They are not alone. Haraden Pratt, a respected historian of electrical science, has observed that Tesla, though mistaken for a dreamer by his contemporaries, "stands out as not only a great inventor but, particularly in the field of radio, as the great teacher."

Even today the debate rages on. In one of those selections that does not so much resolve controversy as preserve it forever in amber, the Nobel committee awarded a shared prize in physics to Marconi and German scientist Karl Braun in 1909. It wasn't until 1943, on the other hand, nearly six months after Tesla's death, that the U.S. Supreme Court concluded a long-running patent dispute by ruling that three turn-of-the-century inventors—Sir Oliver Lodge, John Stone Stone and Tesla—appeared to have

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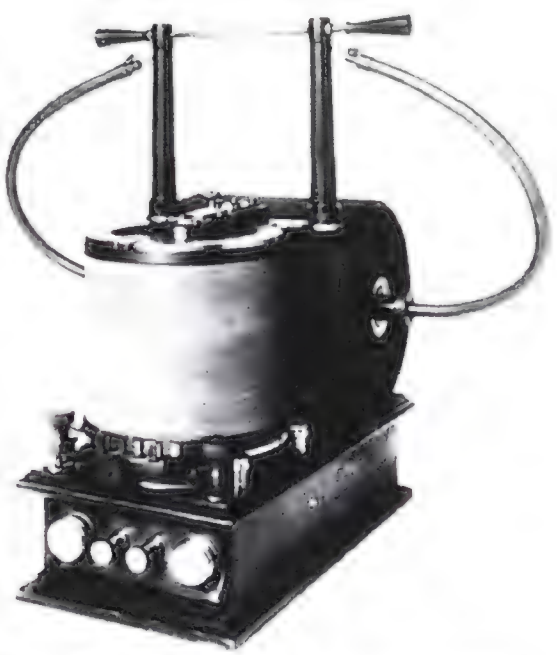
priority over Marconi in radio-tuning circuits. Tesla was usually gracious about credit, but he let down his guard in a 1927 conversation with a fellow Yugoslav. "Mr. Marconi," he opined, "is a donkey."

Many would agree that Tesla was much the more gifted inventor. During the incredibly fertile decade between 1890 and 1900, his inspired tinkering anticipated a rich catalog of modern devices. He apparently conceived of something like fluorescent lighting, "black light" and neon. In experimenting with his so-called "button lamps," Tesla predicted the existence of cosmic rays; Nobel laureates Robert Millikan and Arthur Compton both acknowledged Tesla's early speculations in this field. In his work and writings, one sees the germ of such seminal technical developments as the cyclotron and the electron miscroscope. In a tour de force of electrical engineering that opened at Madison Square Garden in 1898, Tesla guided the movements of a scale-model boat through a large tank of water by remote-control radio waves.

And yet, in a reversal of fortunes perceptible only in retrospect, Tesla's career soon began an irreversible decline. Perhaps as a backlash from the academic community (it is said that he never submitted a single article to



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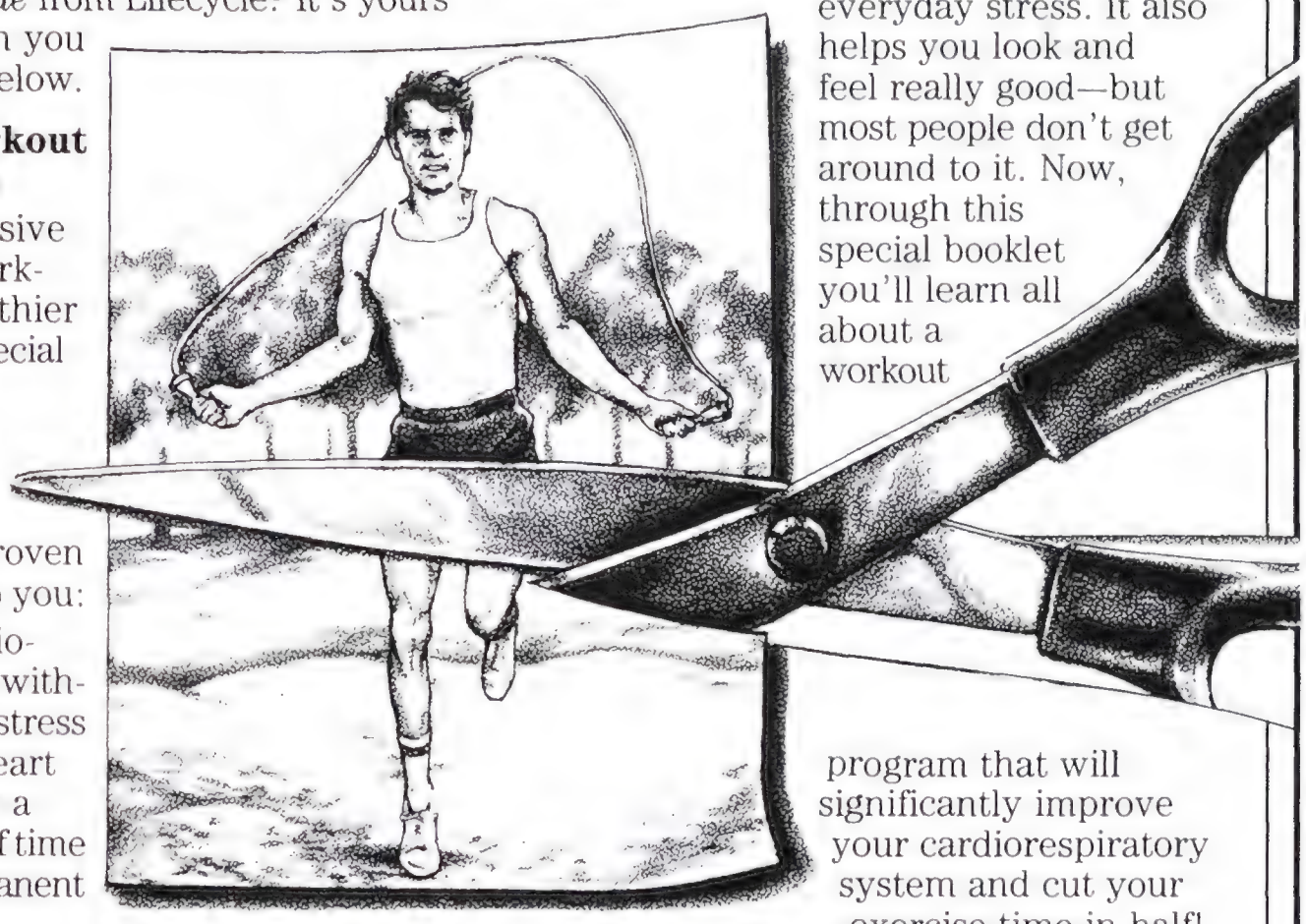

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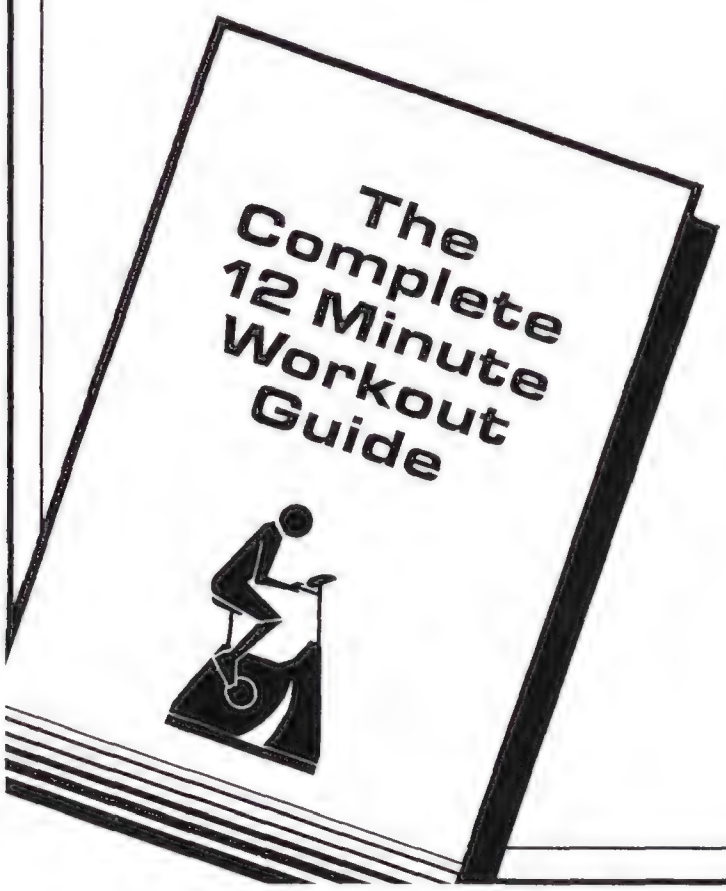

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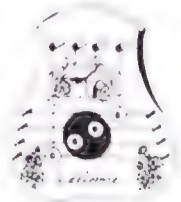

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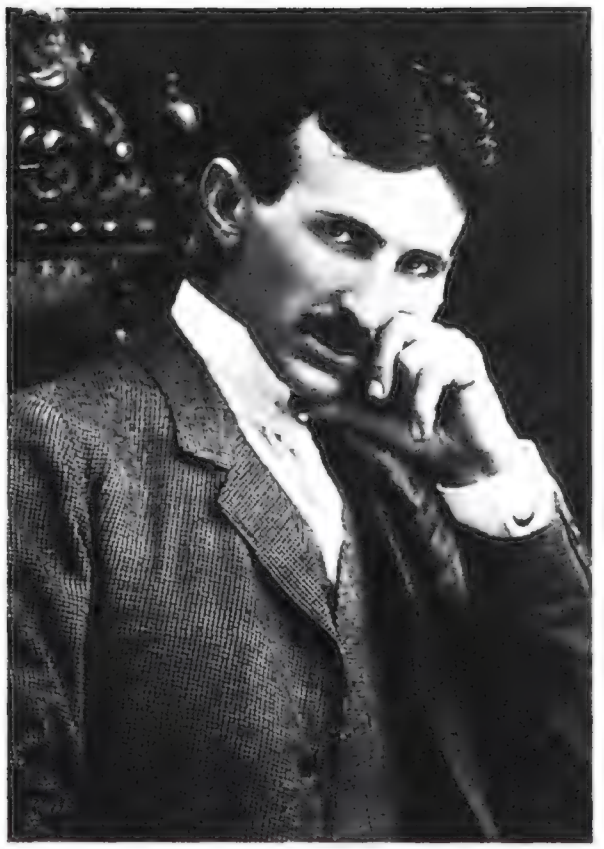
an academic publication), perhaps because there was a professional jealousy about his public grandstanding, Tesla found credit harder to come by, credibility harder to maintain. No one rushed to support his studies anymore. His mind remained fertile, but then as now, science is an expensive undertaking; those who can't afford to do experiments cannot reduce theoretical ruminations to practical application.

In 1899, Tesla set up a laboratory in Colorado Springs and essentially built a barn around, and flagpole above, the world's largest Tesla coil, 52 feet in diameter (p. 122). In the course of experiments, he sent bolts of man-made lightning soaring some 135 feet into the air, created thunder heard 15 miles away. He was also among the first to invent the blackout; the power demands of one experiment burned out Colorado Springs' electric plant, plunging the town into darkness. Tesla believed he had demonstrated the wireless transmission of power, but the experiments have never been considered an unqualified success.

Huge transmitting tower was part of an unsuccessful worldwide wireless system.



The darkly brooding Tesla looked more like a magician than a scientist.

There was one last hurrah for this ambitious concept. Tesla had grand plans to construct a huge radio transmitter (p. 132) on Long Island called, with romantic panache, Wardenclyffe. He got J. P. Morgan to fund it and noted architect Stanford White to design the building. Then a string of scientific and psychological setbacks ensued. Morgan withdrew support and in 1906 work ceased. In 1917, the wooden tower, by then rumored to be a hideout for German spies, was blown up.

Dangerously close to a parody of the lone-wolf inventor, Tesla dunned former patrons for research support. This time the Westinghouses and the Morgans had no interest. The inventor who once exuded charm and suavity now seemed a pest. His scientific ideas, so often visionary, began to take on a reactionary cast. The emerging age of quantum physics passed him by, and Tesla spent many ill-used hours trying to disprove Einstein's theory of relativity.

His contributions did not go totally neglected, however. In 1916, the American Institute of Electrical En-

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gineers, the premier professional organization in the field, voted to honor Tesla with its prestigious Edison Medal. Tesla at first balked, and his bitterness spilled out. "You would bestow an outward semblance of honoring me," he wrote the organizers, "but you would decorate my body and continue to let starve, for failure to supply recognition, my mind and its creative products which have supplied the foundation upon which the major portion of your Institute exists."

Ultimately Tesla relented, although his sensitivity was not entirely misplaced. H. Otis Pond, an engineer who worked with both Edison and Tesla, in a way seconded Tesla's discontent. Edison, he believed, was "the greatest experimenter and researcher this country has produced—but I wouldn't rate him as much of an originator"; Tesla, he said, was "the greatest inventive genius of all time."

Perhaps it was that very genius that exacted a huge emotional price from Tesla. There is a touching and revealing story that during electrical storms, he would order his black mohair couch to be moved in front of a window. There, by himself, he would sit in the dark and privately applaud bolts of lightning with the rapture and relish of one artist appreciating the work of an equal.

For much of his life he had been ahead of his time; by 1929, with the Great Depression beginning to unfold, he finally was of his time—his major contributions behind him and able to earn little as a consultant. His personal eccentricities now inspired pity. He was a familiar figure at Bryant Park, behind the main branch of the New York Public Library, where he fed the pigeons, whom he called "my sincere friends." He brought ailing birds back to his hotel room for convalescence and on at least one occasion was asked to leave a hotel because of the avian infirmaries he maintained.

Tesla fully expected to live 125 years, and had planned all along to set his life story and scientific principles on paper one day. But by 1943 he was suffering from heart trouble and fainting spells. Weak and apparently confused, he dispatched a messenger from his room in the Hotel New Yorker to carry a loan of $100 to his friend Mark Twain, dead 33 years. He was furious when told the envelope could not be delivered. On January 4 he complained of chest pains during an experiment and returned to his room. The last person to see him alive was the hotel maid on January 5. Alone, as always without a home, literally and figuratively heartsick, Tesla fended off human aid and comfort to the very end, this time with a "Do Not Disturb" sign. His body was discovered on January 8. He was 86.

More than 2,000 people attended the funeral at the Cathedral of St. John the Divine in Manhattan. A testimonial arrived from President Roosevelt; the Mayor of New York, Fiorello La Guardia, read a eulogy on the radio; Nobel laureates sent accolades. Perhaps the most fitting epitaph was something Tesla himself had said, apropos of the radio controversy, many years earlier. "Let the future tell the truth and evaluate each one according to his work and accomplishments," he told a friend. "The present is theirs, the future, for which I really worked, is mine."

Modern-day experiments like this one by researcher Robert Golka, studying high-voltage discharge and ball lightning, use Tesla-style devices.

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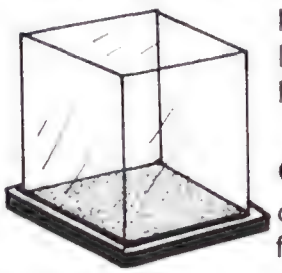

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Book reviews

The Cambridge Apostles: A History of Cambridge University's Elite Intellectual Secret Society
Richard Deacon
Farrar, Straus & Giroux, $19.95

Alfred Tennyson, Bertrand Russell, Ludwig Wittgenstein, E.M. Forster, John Maynard Keynes—a poet, two philosophers, a novelist and an economist. Besides their illustriousness, what these men have in common is membership in the Cambridge Conversazione Society, commonly known as the Apostles or simply the Society.

Founded in 1820 by a group of students with an evangelical bent, the Society evolved into a forum for iconoclasm, where everything, even the existence of God, is fodder for debate. The traditional procedure has been for members to congregate on Saturday evening and debate a paper prepared and read aloud by one of the brethren (since 1970 there have also been sisters, the possibility of admitting women having first been brought up in 1834). Early topics centered on religious matters, e.g.: "Is the Bible used as an instrument for keeping the poor quiet?" Later they became more freewheeling, as in "Is there any rule of moral action beyond general expediency?" or "Is there a duty to hate?"

In the 1930s a member epitomized the desirable qualities for admittance: "One must be *very* brilliant and extremely nice." Being wellborn doesn't hurt, either: for much of its history, the Society has drawn heavily on Cambridge's aristocratic Trinity College for its embryos (those being considered for membership). Belonging to the Society has left a profound impact on many a member. Even so fiercely independent a thinker as Russell called membership "the greatest happiness of my time at Cambridge."

Among those who shaped the Society were Samuel Taylor Coleridge, G.E. Moore and Giles Lytton Strachey. Though not a member, Coleridge knew several men who were. Moreover, he was a brilliant conversationalist—or rather monologist, for it was often hard to get a word in edgewise when he was holding forth. There are those who believe that Coleridge squandered his genius in garrulity. "If Mr. Coleridge had not been the most impressive talker of his age," William Hazlitt wrote, "he would probably have been the finest writer. . . ." At any rate, his opinions frequently found their way into Apostolic mouths.

George Edward Moore was a philosopher who insisted on the dogged clarification of terminology as a prerequisite to genuine debate. His credo, expressed in his lucid masterpiece *Principia Ethica*, included the tenet that "personal affections and aesthetic enjoyments include *all* the greatest, and *by far* the greatest, goods we can imagine." Besides constituting an endorsement of the Society's raison d'etre, this apothegm exerted a profound influence on the Bloomsbury Group.

Lytton Strachey was a central figure in that group, as well as the author of the impious *Eminent Victorians*. "His manner was languid and anything but dictatorial," Richard Deacon writes, "he exuded sweet reasonableness, yet he controlled the Society as nobody before or since has managed to control it. . . ." Along with Keynes, he promoted homosexuality among the Apostles until it achieved something of a cult-within-the-club status.

Richard Deacon is the pseudonym of Donald McCormick, a newspaper editor and historian specializing in espionage and diplomacy. It is doubtful that he would have made a good Apostle himself: he can't resist pontificating on peripheral issues. Thus, the reader is instructed that Keynes' "idea of creating employment by increasing public works has always been somewhat of a fallacy except in very special circumstances" and that *A Passage to India* is "by no means the best of Forster's work." The mere fact that both men were Apostles hardly serves as a license for such peremptory dismissals.

When Deacon sticks to the point, however, he provides a lively, gossipy history. He is especially good on the Society's post-Bloomsbury period—the flirtation with Communism in the 1930s (traitors Guy Burgess and Anthony Blunt were both members) and the uneasy recent period, when no one seems to have dominated the proceedings. Reading *The Cambridge Apostles* is an exercise in intellectual nostalgia, a reprise of those college nights when, given the right companions and, perhaps, sufficient beer, it seemed there was time enough to pursue all the world's burning questions to momentous conclusions.

Dennis Drabelle
Washington writer and critic

Islands of the West From Baja to Vancouver
Photographs by Frans Lanting
Text by Page Stegner
Sierra Club Books, $35

Ask an American to name an island or two on the Atlantic seaboard and he shouldn't have much trouble. Martha's Vineyard and Manhattan are pretty well known, and the coast is practically fringed with capes and holiday playgrounds all the way down to the Kennedy Space Center. But ask about islands off the West Coast and the response might well be a shrug. The fact is that from Seattle to the Mexican border there is hardly a speck in the ocean. And

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the few exceptions—craggy pinnacles such as the Anacapas or the granite peaks of the Farallons—are for the most part known only to nearby residents or to geographers and marine-wildlife enthusiasts.

Nor are swarms of tourists ever likely to discover the more isolated islands that Page Stegner tells us about in this beautifully produced portrait of the offshore territories. A couple of the California isles are private; visits to others are restricted by the National Park Service and conservation agencies and access can be daunting. Landing at Santa Barbara Island means braving the surf and leaping from a rocking boat onto a metal ladder; on the Farallons, provided the weather is calm enough, visitors are plucked from their boat by a crane and swung ashore "clinging to a sort of trellis of twine attached to a truck tire."

Farther north, above Seattle, islands sprout by the hundreds in the waters of Washington and British Columbia and they have "haciendas" and motels and shopping malls. But for the little-known islands of California, isolation is a benefit, says Stegner, because these make up "the most invaluable natural laboratory in our territorial waters for the study of marine mammals, seabirds, and intertidal organisms." San Miguel claims the most diverse population of pinnipeds in the world (six species). The Anacapas are a breeding headquarters for brown pelicans, and the Farallons support the biggest North American seabird rookery south of Alaska.

In distinctly different fashion, Stegner's descriptions and Frans Lanting's photographs take us from Isla Cedros off the coast of Baja California, an arid outpost for pirates in the 16th century and whalers in the 19th ("It looks like a pile of rusted scrap"), to Canada's Vancouver Island and the wilderness of the Inside Passage. Much of it is now being "ferociously logged, overfished, and loved to death by ever increasing hordes of tourists." Stegner's narrative is breezy; Lanting's pictures are serene—surf-misted reefs, forests shrouded in fog, the desert landscapes of Cedros, blazing banks of sunflowers (tree sunflowers grow so densely on the Channel Islands northwest of Los Angeles that some people claim they can see the yellow glare on the mainland 24 miles away). His shots of sea lions and seals and whales are touching and funny and almost awesome.

The Channel Islands provide some of the earliest evidence of human habitation in America—prehistoric cooking pits and mammoth bones found on Santa Rosa hint at California barbecues more than 40,000 years ago. For countless years after that, native inhabitants lived in "reasonable harmony with their waterbound world" ("They had neither the numbers nor . . . the technology to foul it up"). In recent centuries, however, the Pacific islands have been plundered by seal hunters, raided for seabirds' eggs to make omelets for California gold seekers and stripped of greenery by grazing sheep. The land is recovering from the abuse, says Stegner, thanks to such legislation as the Coastal Zone Management Act. But greater threats to the coastal environment may lie ahead, he warns.

"And while it is comforting to read that the U.S. Navy has decided not to scuttle nine nuclear submarines . . . at various deep-sea disposal sites, the fact that it was even proposed forces one to consider the possibility that in the long run the destruction to our coastal environment caused by our whaler, sealer, and egger forebears may appear minor in comparison to the effects of oil and mineral exploration and the use of our oceans as repositories for industrial, municipal and nuclear waste."

David Lancashire
Globe and Mail, Toronto

Tree sunflower, giant coreopsis, grows elsewhere, but "nowhere in the same spectacular density it reaches" among the Channel Islands off California.

The English Channel
Nigel Calder
Viking, $24.95

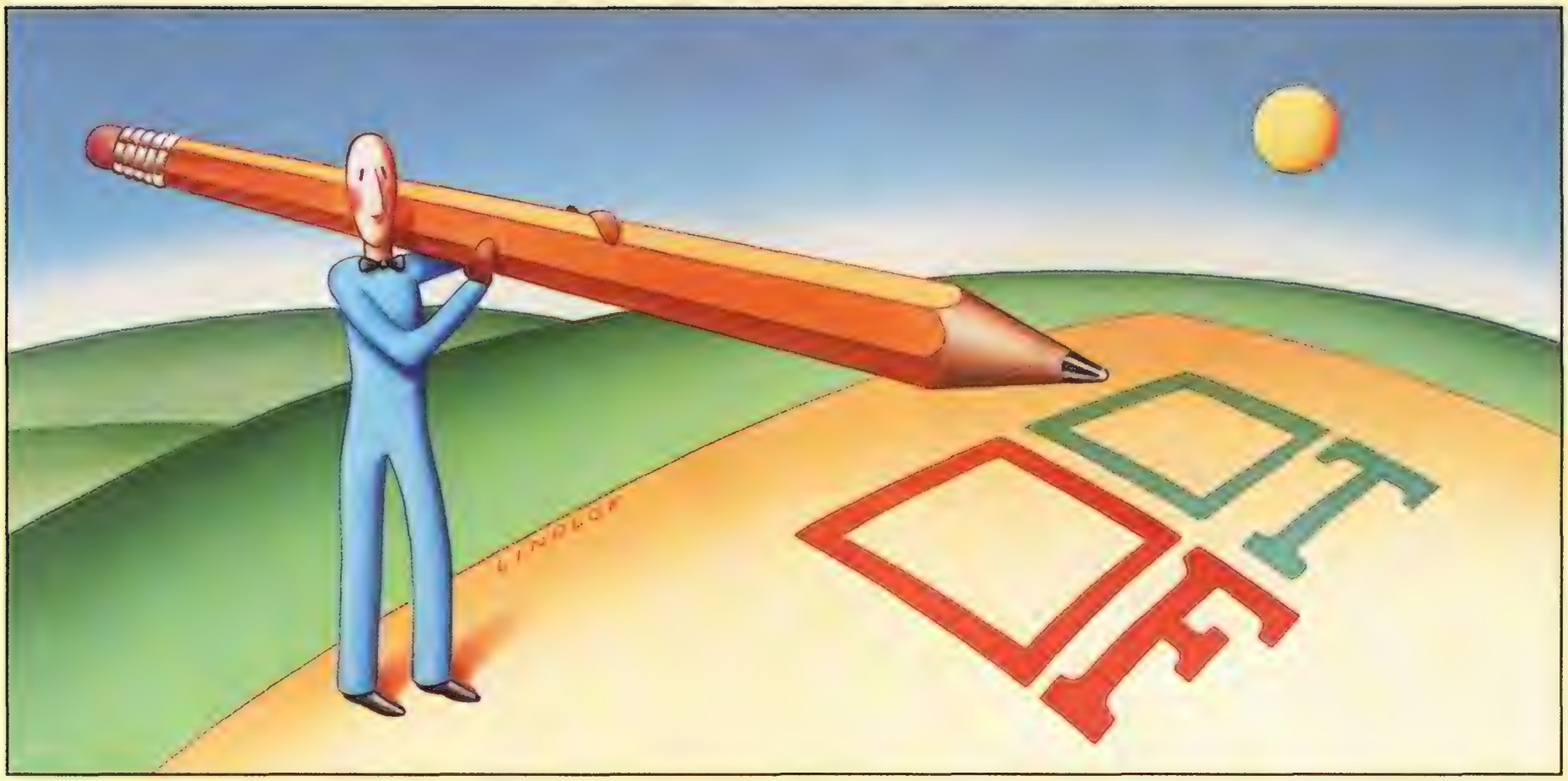
A young American lawyer named Frank Davidson got sick to his stomach on a stormy Calais-to-Dover Channel crossing 30 years ago. He spent the next decades planning an alternative crossing, a twin railway tunnel under the Channel. Last January, the French and British governments signed an agreement to permit private construction of the tunnel.

You won't find Davidson's story or details of the new "Chunnel" accord in Nigel Calder's *English Channel*. But you will find almost everything else to do with these world-shaping waters in this, the 15th book by an accomplished British science writer. His *The Comet is Coming!* (SMITHSONIAN, September 1981) far outshone not only the surfeit of literary competitors but the current dim showing of Halley's ice ball.

This time round, Calder has marshaled an armada of fascinating Channel lore from seaside archaeology to seafloor geology, epic naval encounters to modern navigational techniques aimed at avoiding epic accidental encounters. And he even gives mal de mer its just due. "The Dover Strait is Lake Vomitorium," he announces before setting off on an explication of the tidal currents, the physiological causes of seasickness and a review of medieval law on the matter—"contracts made at sea had no validity because the victim of seasickness might agree to anything that would shorten the voyage."

Calder maintains his command over these waves of information with an ingenious device: we are all passengers on his ketch, *The Charmed*, on its own beleaguered Channel crossing.

And charmed we are, by each of many



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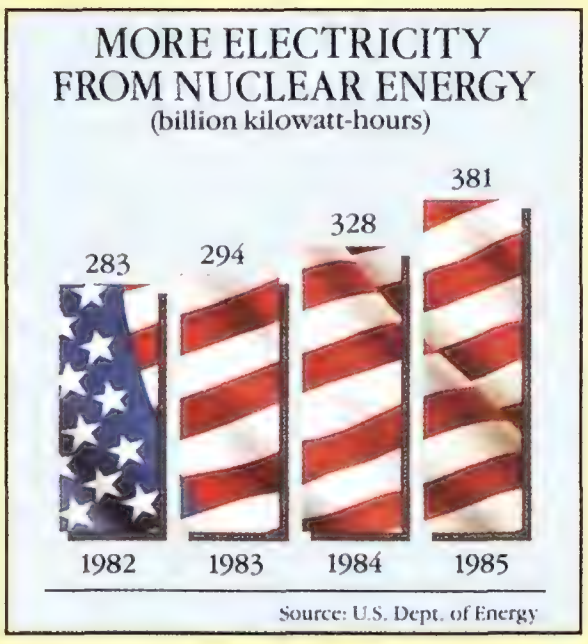

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landfalls. Hugging the Breton coastline which he describes as "cubist sculpture," Captain Calder meets clever 17th-century corsairs such as René Duguay-Trouin, who captured and sank 188 ships in his privateer career and, with 13 warships borrowed from the King of France, seized Rio de Janeiro and ransomed it back to the unlucky Portuguese.

Not far downwind is the Rance tidal station where, two decades ago, French engineers harnessed as a steady source of electrical energy, tides that range around 40 feet.

And close by also is the Roman port of Alet, departure point for a brief excursion into pre-Christian shipbuilding and Bronze Age marine trade.

To the south, on the shores of Normandy, we set off with Britain's medieval conquerors and alight with Europe's World War II saviors. To a compelling account of D-day strategy Calder brings such fascinating anecdotes as the harrowing James Bond-like adventure of two British soldiers sent New Year's night 1944 to collect soil samples from the Normandy beaches (to determine if the sand would support landing vehicles). And equally memorable for its eccentricity is the behavior of one Marie Bernard, "the angel of Hermanville," a French nurse who bicycled to the beach in the midst of the June 6 sound and fury to retrieve a bathing suit she'd left behind.

Captain Calder doesn't desert scholarship or craftsmanship when he sets off for the English shore. He's already passed well south of the Bosseven Rocks, as Isolde did in trying to reach her dying Tristan, and the Portsall Rocks where the *Amoco Cadiz* dumped its oil. Now Calder skirts the Casquets, which "rank high among English Channel assassins," and Channel Islands that stand out like "black squares of a crossword puzzle." Calder's own fine Channel similes are bolstered by those of Matthew Arnold, Tobias Smollett, William Blake and Shakespeare.

Calder takes on as much fascinating anecdotal cargo at his English dockings as at his French harbors. He relates how 18th-century food faddist Richard Russell, who recommended imbibing a pint of seawater a day, spread the fever for seaside vacations. Calder blames Russell for England's seashore Gomorrahs, as "soon the healthy rich followed the invalids to Brighton, and made adultery its heavy industry."

Other industries well noted are the fluctuating herring and pilchard fisheries and the natural gas discoveries off Bournemouth. Also smuggling, which once supported the coastal economy and the likes of Resurrection Jackman of Brixham, who showed up as a ghost at his own funeral to distract attention from his coffin, which was full of untaxed brandy.

Great naval encounters in the Channel may be a curiosity of the past, wandering Soviet and American nuclear submarines notwithstanding. But Channel smuggling goes on, as Calder observes, citing the recent seizure of a $25 million Thai heroin shipment at Southampton.

The Channel remains a principal waterway in licit international trade as well. But its true importance, Calder observes, remains a reflection of its form: a "Megaphone . . . the Channel of English, by which the language has been broadcast around the Earth." So we disembark from *The Charmed* and board the *Mayflower* in Plymouth, bound for home. And far happier to have crossed the Channel in Calder's pages than aboard a ferry.

Don Lessem
Critic and naturalist

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Fighting Soldier: The AEF in 1918
Joseph Douglas Lawrence
Colorado Associated University Press, $15

So often, when we come upon the memoirs of someone who was part of a great event—a person who did not direct the event, was not even a professional observer, just a survivor—we're disappointed.

There he was, a member of history, helping to make it happen, and all he can remember is what happened before and after. And our hunger to know how the crisis itself felt—what the air smelled like, how the mud sucked at one's shoes, whether the grass was wet and how a lark sounds in the dawn—goes unappeased.

This short account of the Meuse-Argonne fight in the last weeks of World War I starts off as though it intended to be just such a book. The horseplay in training camp, the approach to the Front, the descriptions ("Brick walls, single, without support, towered at dangerous angles; church steeples stood alone, the main parts of the churches blown away; chimneys without houses . . . . "): it sounds like a letter home.

But then the fighting starts and suddenly the story is galvanized. Gradually we realize that the self-deprecating author, a brand-new second lieutenant at the time, was an authentic hero.

Bedeviled by senior officers who hid in their dugouts, Lawrence soon found himself directing the defense on his little wooded hillside. His 25-man platoon, shot to pieces, held the line even when the flank units broke, and when he ran low on ammunition he ordered a bayonet charge in the great tradition of Joshua Chamberlain at Gettysburg.

"We had been under continuous shellfire, rifle and machine-gun fire, gassing, attacks by planes, no food, and only what muddy rainwater we could get from holes in the ground," he writes, after five days of wild combat. "It was drizzling rain and cold, the men were wet to the skin, cold, hungry, thirsty, some of them frightened, many sick from the gas, all in dread of the never-ceasing, screaming, crashing shells."

A succession of maps brings us right down to tree level in Lawrence's battle. There is no grand talk of strategy, just the excitement of finding a great spot to site a machine gun; the struggle to collar men as they slipped away from the front line in the night; the short, desperate fight to save a man whose leg has been smashed.

"Stuart and I put a tourniquet on the stump of the wounded man's leg. He was conscious and asked if the doctor was coming, and I told him, 'Yes, he will be here in a few minutes.' But I saw that a doctor could do him no good, and he died in a few minutes. There were, of course, no doctors around at such a time."

As a competent soldier, Lawrence tends to be outspoken about malingerers. He takes a few swipes at General Pershing, too, revealing the AEF commander as yet another of those high-ranking slow learners so common in that war. He also charges that though Pershing was given 29,000 Browning automatic rifles and 27,000 heavies, then perhaps the best in the world, he "was so proud of them that he did not allow their use on the Western Front until near the end of the war, for fear the Germans would capture and copy them."

A loving job of editing by Robert H. Ferrell has spared us much of the peripheral material, leaving us a terse and memorable account of what it was like to be under fire in 1918.

Michael Kernan
Author of *The Violet Dots*

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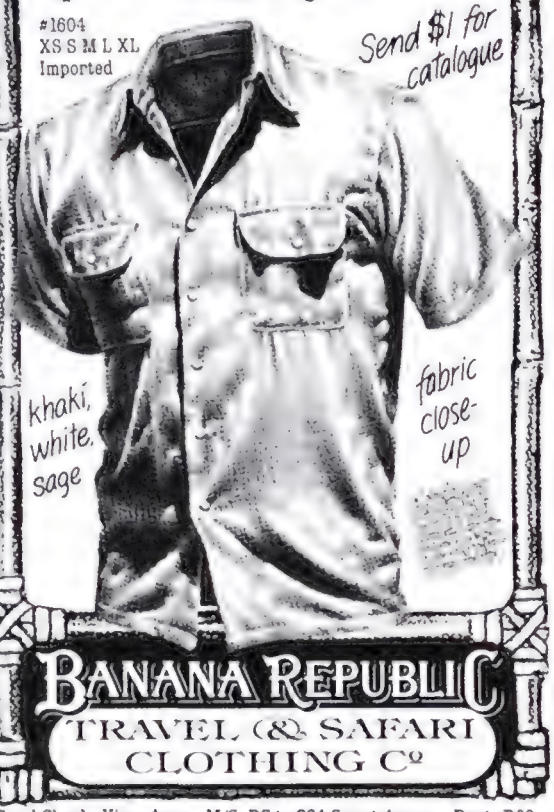

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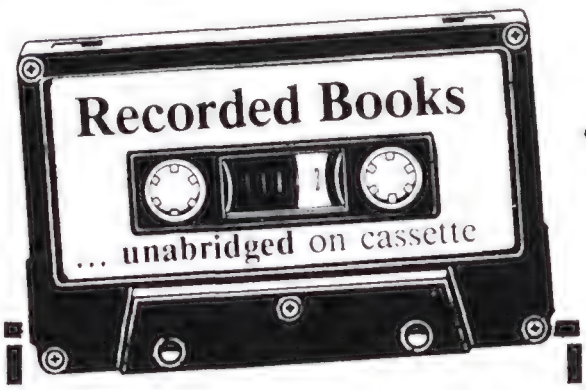

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30-day rentals from just $5.95.

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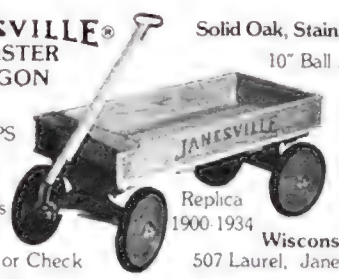

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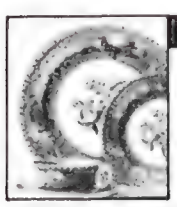

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Smithsonian highlights

Franz Liszt will be honored this month at a major festival in Washington, D.C.

During the week of June 22-29, the one hundredth anniversary of the death of charismatic and controversial composer Franz Liszt (right) will be celebrated in Washington, D.C. Presented jointly by the Kennedy Center, the Library of Congress and the Resident Associate Program of the Smithsonian, the festivities will include concerts, recitals, lectures and a symposium. A series of recitals by William Parker, Victoria Livengood, John Douglas, Russell Sherman, Jerome Rose, Aaron Rosand and Jorge Bolet will be presented at the Smithsonian, while master classes, lectures and concerts will also be held at the Library of Congress, St. Matthew's Cathedral and the Washington Cathedral. The final concert will be at the Kennedy Center. For details, call (202) 357-2498 or (301) 490-5261.

The time has again arrived for the annual Festival of American Folklife, which will be held on June 25-27 and July 2-6. The tents and stages—which will present the cultures of Japan and Tennessee, traditional crafts, and the folk traditions of trial lawyers (this should be interesting)—will be set up on the National Mall between 10th and 14th streets. For more information, call the Visitor Center at (202) 357-2700.

Planning a Smithsonian visit?

Get a head start—send postcard request or call for a free Associates' Planning Packet: Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560; (202) 357-2700 or TDD for hearing impaired (202) 357-1729. Begin your visit at the Associates' Reception Desk in the Castle, where from 10 A.M. to 4 P.M. daily, you'll receive a cordial welcome, printed materials in a handy bag, and details about benefits.

Special June exhibits and events

Cooper-Hewitt Museum (New York)
Tall Ships (June 3-September 14) More than 50 embroidered "ship portraits" done by sailors during the slow times at sea.
Bon Voyage! Designs for Travel (through July 13) Suitcases, trunks, other portable items.

National Museum of Natural History
Scientific Illustration: Works by Members of the Guild of Natural Science Illustrators (June 9-22) See *Highlights continued.*

National Air and Space Museum
On the Wing (opens June 20) Premiere of new IMAX film; admission fee.
Looking Out from the Inside: The Hubble Space Telescope (June 25; 7:30 P.M.) Lecture by C. Robert O'Dell.

National Museum of American History
Hollywood: Legend and Reality (through June 15) History of the motion-picture industry.
Patent Pending: Models of Invention (June 20-November 16) More than 100 models.

National Portrait Gallery
Davy Crockett: Gentleman from the Cane (June 14-September 14) Includes numerous portraits of the frontiersman, and many of his possessions.

Hirshhorn Museum & Sculpture Garden
Robert Arneson: A Retrospective (through July 6) Sculptures, drawings, mixed media.

Smithsonian on the air

Radio Smithsonian: features on this weekly half-hour series include the history of the film industry and the life of Davy Crockett.
Smithsonian Galaxy: short radio features explore history, science, art.
Here at the Smithsonian. . . .: short features present TV sights, sounds, behind-the-scenes activities.

To find out what stations in your area carry these programs, write: Office of Telecommunications, MAH Room BB40, Washington, D.C. 20560.

Lecture and Seminar Program

Associates in North Carolina and California will have the opportunity to meet Smithsonian curators and scientists when the Lecture and Seminar program visits Appalachian State University (Boone, North Carolina), June 24-28, and San Diego, July 10-17. The Appalachian State program features residential seminars on American art, fossil identification and creative writing. Highlights of the San Diego program include lectures on Abstract Expressionism, native American art and entomology, and seminars on historic aviation and American art. Associates in these areas should have received information by this time. For further information, write: Lecture and Seminar Program, A&I 1190, Smithsonian, Washington, D.C. 20560.

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Patrick Ireland: Drawings 1965-1985 ($6)
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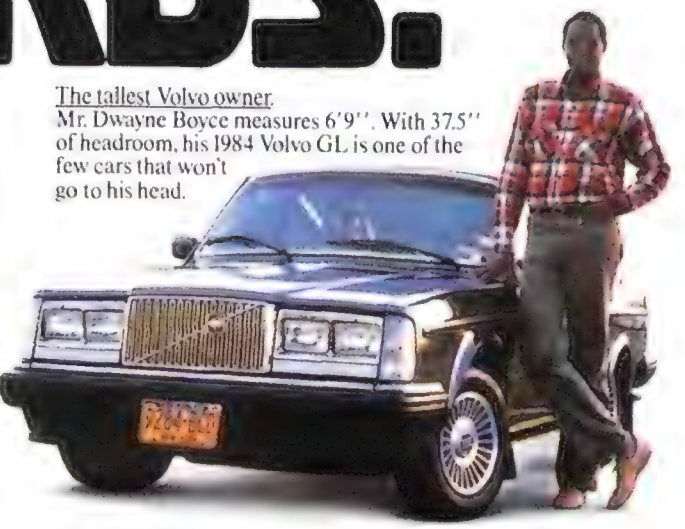

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P.M.) Slide-illustrated lecture by mountaineer Arlene Blum who trekked from one end of the mountain chain to the other.
The Philippine Music Ensemble (June 13; 7:30 P.M.) Traditional and contemporary music on such instruments as the angklung, gamelan ensemble and bunkaka, as well as the piano and other familiar instruments.
Ice Age Summer (June 19; 8 P.M.) Lecture by Robert S. Hoffman, new director of National Museum of Natural History.
The Way of the Dream (June 21, 22) Two-day seminar combines Washington premiere of a series of 20 half-hour films featuring dream interpretations by Jungian psychologist Marie-Louise von Franz.
On the Wing (June 21, 23 and 24; 7:30 and 9 P.M.) Debut of new IMAX film about flying creatures and manned aircraft, introduced by members of the team that created it.
Country Houses in Context: American and English (June 23; 6 P.M.) Slide lecture by Roger Kennedy, director of the National Museum of American History.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some June exhibitions:
Charleston, Illinois (June 14-July 13) *The Dog Observed*, Tarble Arts Center.
Davenport, Iowa (June 28-September 14) *Anasazi World*, Putnam Museum.
Detroit (June 14-July 27) *Sharing Traditions: Five Black Artists in 19th-Century America*, Detroit Institute of Arts.
New York City (June 7-July 20) *The Master Weavers*, Fashion Institute of Technology.
St. Louis (June 14-August 31) *Athletes and Heroes: Portraits from the TIME Collection at the National Portrait Gallery*, Museum Shops at the Marketplace.
San Diego (June 1-July 30) *Audubon: Science Into Art*, San Diego Natural History Museum.
Santa Barbara (June 7-July 20) *Three Hundred Years of German Painting and Drawing from the Collections of the Wallraf-Richartz Museum, Cologne*, Santa Barbara Museum of Art.
Stamford, Connecticut (June 5-August 20) *Yesterday's Tomorrows: Past Visions of the American Future*, Whitney Museum of American Art (branch).
Tampa, Florida (June 14-August 31) *Twenty-five Years of Manned Space Exploration*, Museum of Science and Industry.
Wausau, Wisconsin (June 17-July 28) *An Age of Gold: Three Centuries of Painting from Old Ecuador*, Leigh Yawkey Woodson Art Museum.

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Art and science shake hands

This month at the Museum of Natural History, artists prove that expertise can be esthetic

Most interesting careers today require a fairly extensive knowledge of more than one field, and nowhere is this more true than in scientific illustration. A drawing that is made, usually for publication in a journal or textbook, must be accurate (in many cases, a drawing can show more detail than a photograph); but once that requirement is satisfied, the work is judged for its esthetic qualities.

There are some illustrators, like Sally Bensusen, who started out as scientists (in her case, as an astronomer) and then were seduced by art. "I didn't know that you could do art and science together and get paid for it," she says. "At first, I was just doing drawings for my own use. But then I got hooked up with the Guild of Natural Science Illustrators. Eventually, I left the observatory and took up the art full time."

Today, outstanding programs in the growing field are offered at places such as Johns Hopkins and the University of Michigan. The latter program is headed by Gerald Hodge, whose sunflower seed head (shown here), along with works by Bensusen and 109 others, will be on exhibit June 9-22 on the second floor of the National Museum of Natural History.

Constance Bond

A trompe l'oeil ink-and-acrylic by Jane Hurd shows disease of osteoporosis.

Sally Bensusen airbrushed comet with nucleus break-up and ion tail disturbance.

Robert Tope's illustration (below) is of ice-core drilling at a Peruvian site.

Portrait of tree frog in its natural habitat was drawn by Deborah McDonnell.

For sunflower seed-head background, the artist used coffee grounds and crayon.

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Domestic Study Tours

Williamsburg for Families June 25-29: Families with children 7-14 enjoy Colonial activities.

Grand Canyon July 11-21: Raft with expert boatmen through magnificent landscape.

Waterton-Glacier International Peace Park July 11-22 or July 25-August 5: Experienced hikers tour backcountry with guides.

Oregon July 17-27: Fresh sea air, mountain vistas highlight this outdoor adventure.

The Black Hills July 26-August 2: Explore Indian culture and cowboy lore in the splendor of South Dakota's Badlands.

Green River Journey July 30-August 9 or August 28-September 7: Experience the thrill of white water, Utah's canyonlands.

Middle Fork August 5-13: An unforgettable river trip on Idaho's Salmon River.

Colorado Mining and Railroads August 8-16 or September 26-October 4: Relive the Gold Rush days when steam locomotion opened the West.

Crow Canyon Archaeology August 24-31: Join archaeologists near Mesa Verde, Colorado, to participate in a dig.

Utah's Canyon Country September 1-11 or 17-24: Choice of two itineraries to explore red-rock land of deserts, canyons and rivers.

Delta Queen September 11-19: Steamboat adventure from Cincinnati to St. Louis along Ohio, Tennessee, Cumberland rivers.

Treasure Houses of Early America September 20-27: Private tours of Winterthur, historic homes, museums around Wilmington, Delaware.

Maine September 20-28: Hike rocky coast, inland mountains with naturalist.

Alaska's Inside Passage September 20-30: Cruise from Ketchikan to Seattle: see killer whales and turquoise water of Glacier Bay.

Essence of Philadelphia October 15-19: Discover the people, neighborhoods and cultural institutions that shape the city.

Okefenokee Swamp October 11-18: Canoe and camp in this wilderness sanctuary for millions of singing creatures.

Cajun Country November 3-10: Experience Louisiana, from New Orleans jazz, Creole cooking to mysteries of the bayou.

Washington "Anytime" Weekend: Discover your capital city in Smithsonian style. Enjoy private tours and luxurious hotels for a perfect weekend getaway. Must reserve ten days in advance.

Foreign Study Tours

People's Republic of China: Ten unique itineraries: hike, travel by train, study decorative arts, visit Nepal and Tibet . . . tours for first-time and repeat China travelers.

Countryside Programs From June to September: Explore one of four scenic and historic areas in Switzerland, Austria, Italy or England.

Island World of Britain June 15-July 3: A circumnavigation to explore ancient ruins, great houses and remote hamlets.

Cities of the Sea June 22-July 6: Gain new insights into history, art, architecture in France, Spain, Morocco and Portugal.

England for All Ages July 2-14: Special tour for Associates who want to introduce their families to England. Live in London and Cirencester, enjoy day trips.

Europe by Train August 13-September 1: Luxury and splendid vistas on *Orient Express*, Switzerland's *Glacier Express*, France's swift *TGV*.

Volga Cruise August 19-September 9: Activities in Moscow, Leningrad, Georgia precede 9-day cruise to historic cities.

Irish Walk September 5-17: Take day hikes through a variety of settings in the Ring of Kerry and Connemara.

Crown Jewels of the Hapsburg Empire September 6-21: Explore museums, cultural life in Prague and Vienna with emphasis on Central European art, history.

Oxford Smithsonian Seminar September 12-27: Be an Oxford Scholar. Attend classes and field trips.

Yugoslavia September 18-October 3: Discover Oriental cities with mosques, medieval towns with castles set against Alps.

Scandinavian Design: Past and Present September 21-October 5: Enjoy a wealth of artistic expression: see museums, galleries, design ateliers, artists' studios.

Black Forest Walking Tour September 27-October 10: St. Moritz and the Black Forest provide spectacular sights for hikers.

In Pursuit of Brazil September 30-October 17: An enormous land of contrasts and exuberance to fascinate you.

Canals and Countryside October 1-12: Cruise through picturesque English and Welsh countryside on famous canals.

Voyage to Mythical Lands October 1-15: Sail to Aegean islands rich with legends reflecting ancient cultures. Discover the Byzantine grandeur of Constantinople.

Bermuda October 16-23: Reside at Biological Research Station while exploring island's diverse habitats.

Write National Associates, Capital Gallery 455, Smithsonian Institution, Washington, DC 20560 or call (202) 287-3362 for tour brochures

in Washington

Smithsonian Seminars

Expand your educational horizons this fall as you combine a pleasure-filled visit to the nation's capital with stimulating week-long courses of study that highlight Smithsonian museums and research facilities. These purposeful vacation seminars give you the opportunity to share special interests with fellow Associates.

From September 21 through 26, Smithsonian scholars will lead exciting new seminars. In addition to a week of intensive study, participants will enjoy a gala welcoming buffet and an elegant farewell dinner. Hotel is optional.

Biodiversity

Join Smithsonian scientists and other nationally known scholars for a wide-ranging look at the impact of shrinking natural habitats on the world's plant and animal species during the National Forum on Biodiversity, cosponsored with the National Academy of Sciences.

Native American Cultures

Explore the Smithsonian's collections of native American basketry and pottery as you study history of American Indian tribal life and visit a Paleo-Indian excavation site in the Shenandoah Valley.

Music at the Smithsonian

Enjoy the range of musical activities at the Smithsonian, learn about the European and African roots of American music and trace the evolution of theatrical music, spirituals, gospel, blues, ragtime and jazz.

Aircraft Restoration

Share in the excitement of restoring vintage planes as you attend workshops and demonstrations on woodworking, metalwork and assembly by craftsmen at the Air and Space Museum's Paul E. Garber Facility.

Civil War America: A Visual Record

Relive the Civil War era through the Smithsonian's collections of classic portraits and memorabilia and with visits to landmark buildings, monuments and historic battlefields near Washington, D.C.

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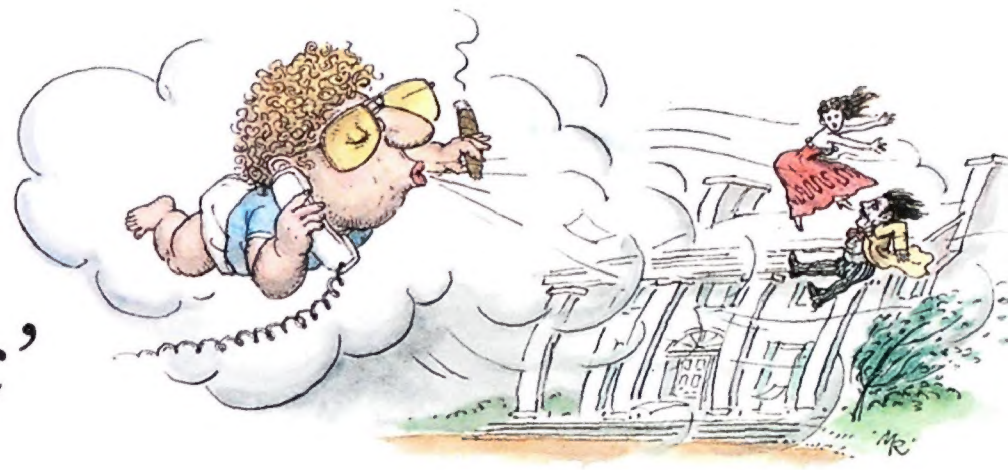
'Meryl is dying to do Scarlett anorexic'



If June 30 marks the 50th birthday of *Gone With the Wind,* the book, can the golden anniversary of *GWTW,* the movie, be far behind? I mention this only to pose a more serious question for today's New Hollywood: Whatever has happened to the sequel?

As usual, creative differences were cited, but that was just Tinsel Town airing its designer linen again. The real reason *GWTW2* sank with hardly a trace is deeply otherwise. I have in my possession the confidential memos (to himself) of one Barry (Bare) B., (UCLA '80), former Production Chief at Razzmatazz Pictures who now manages a Fast Foto franchise in Eugene, Oregon. The memos tell all—and a sordid tale of life in the Santa Monica Freeway fast lane it is, too.

20 June 1983

You've done it, Bare, scored the hottest property of your career. Meryl is dying to do Scarlett anorexic, something about that turnip scene at the popcorn break of *GWTW1.* Dolly lusts to do Scarlett as Belle Watling's illegitimate daughter if she can wear (and keep) wardrobe of cinch-waist, off-the-shoulder ball gowns by Gucci. Pia's husband will put up half the development nut provided a part can be scored for Scarlett's long-lost, half-breed baby sister. Barbra called too, but did not leave a number. Brunching with Burt at Spago.

1 July 1983

Trouble in Culver City. Burt wants Sally in the picture for old time's sake. I go, no way is she Scarlett. Scarlett nothing, goes Burt, she wants Melanie, Melanie's more likable. Wait a minute, Burt, I go, Melanie dies at the end of the first picture. You wait a minute yourself, goes Burt. Does the audience ever actually *see* Melanie die? Besides, if you ask me any broad *that* Goody-Two-Shoes is brain dead from reel one. I go, I'll get back. At least Bob definitely wants to do Rhett. If he doesn't have to dye his hair, learn more than six lines of dialogue or leave Sundance, Wyoming, in ski season. Barbra called again. Said I was out.

15 July 1983

Great news! Steven wants to direct and George wants to produce, or vice versa. They haven't decided which. Doesn't matter, they say, so long as locations shot in Marin County and the story done in flashbacks from the future. Francis thinks he has the answer: for ten mil a computerized new ILM electronic process that will allow everything, a second burning of Atlanta thrown in, to be superimposed on outtakes from *Birth of a Nation.* Told them I'd check public domain and get back.

2 August 1983

Where are you now that we need you, Leslie, baby? Joanne wants *Paul* to do Ashley but Paul thinks Ashley's an aristocratic wimp and won't sign unless he's rewritten as a grass-roots Democrat. But Paul, sweetheart, I go, this is right after the Civil War, Democrats are not even invented yet I don't think. No problem, Bare, goes Paul, we'll have him do a lot of liberal things the audience can identify with, like free the slaves, drink Bud and race fast horses.

3 August 1983

What a joker that Woody is. He wants to script, direct and shoot the picture on 16mm black-and-white in Manhattan, with Mia wigged out as Scarlett. Offers to play Ashley for nothing if he can write his own interior monologues. I see him as a Freudian Hamlet, he goes, possibly Jewish. But Wood, I go, so OK, so you're the resident intellectual, but when this story opens Freud could not be more than a Viennese teenager. Woody very depressed at this.

Now Prissy is problemsville! Whoopi won't sign for the Butterfly McQueen *shtick* unless Quincy does the music, and Quincy won't do the music unless Whoopi gets either the guy or Tara. Priss ain't no jive farmer, Whoop goes, Priss in medical school, and forget Rhett as my main unless it's Eddie. Eddie won't play Rhett unless he gets creative control and billing above the title. Bob is history. Wanted pitch in the script for conservation of Okefenokee swamp as a national resource.

3 September 1983

Tina says no to Mammy. NAACP says no to Pia, even if she commits not to lip sync spirituals. So lose Pia, lose Mammy. But hold the phone: Dustin wants to do *both* Prissy and Mammy. So help me, right there in Ma Maison, in front of Warren, God and everybody, he goes, give me six big ones up front, Bare, points and a major piece of the cassette action and I'll throw a dozen writers right at it. Dust does love an artistic challenge. Dining tonight with Barbra at Chasen's.

4 September 1983

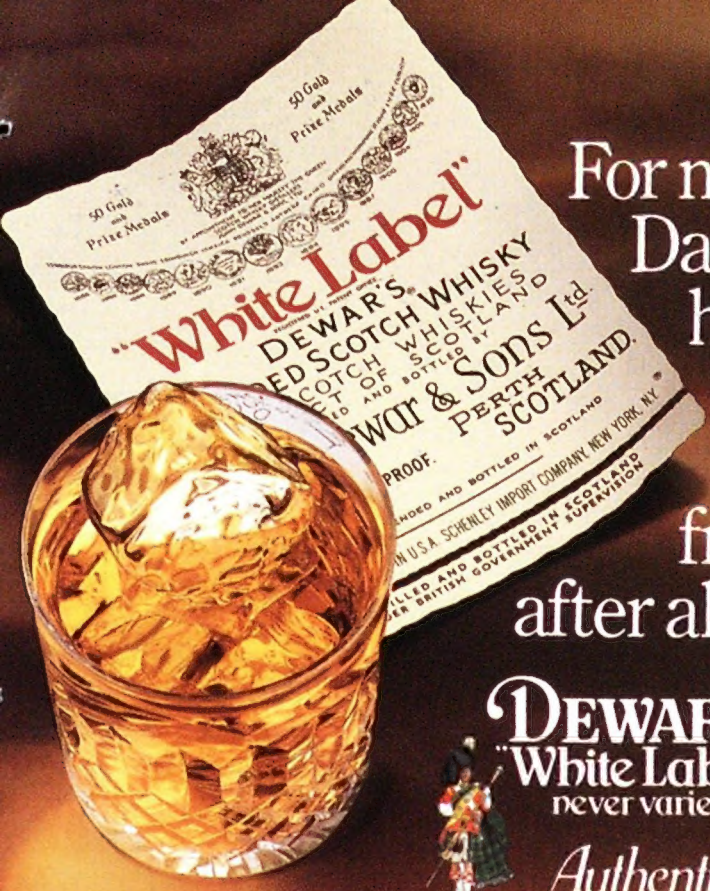
Not only does Barb concept Scarl as poor white trash with a Brooklyn accent, she wants to produce, script, direct, distribute, write the score, sing the title song, record the cast album, adapt musically for the stage, byline the spin-off novel (ghosted) and establish a four-year college for Southern feminists in Marg Mitchell's name. Suggests Sly as her leading man. All of us lunching at the Polo Lounge Saturday.

6 September 1983

Sly shows. Barb is nowhere. Sly in a volcanic snit. Calms down, agrees to cameo appearance as Rhett for 40 percent of the gross if shooting can be wrapped in a week. Sees Rhett as riverboat renegade revulsed by lawless carpetbaggers in cahoots with corrupt Yankee government, who swims the Mississippi in floodtide with Gatling gun and wastes all the little buggers standing between him and the liberation of New Orleans from the British. Sly's manager and I take turns explaining why Sly's concept, while box-office megabucks it may be, is not exactly viable in today's New Hollywood. Viable, schmiable, Sly goes, he'll get back.

10 October 1983

Woody won't return my calls and Pia is suing for breach of mutuality. We may be in trouble here, Bare.



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